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THE JOURNAL OF PERIODONTOLOGY is published to serve as the professional journal of periodontia; to keep dentists in touch with research being carried on in this field and related sciences; to stimulate greater interest in the supporting tissues of the teeth and their relation to oral and general health. The plan to continue the publication of abstracts indefinitely will make the Journal a fund of extensive information, readily available to students, teachers, researchers, and clinicians.

The Journal is the official organ of the American Academy of Periodontology and will contain, therefore, those papers of scientific and clinical interest which are presented at the annual meetings of that society. Abstracts of important articles on periodontia that appeared during the year of 1942 are continued in this and later numbers.

We are grateful to all who have made available the subject matter from which the abstracts and copies of abstracts have been made, including the authors of the original articles, owners of the journals mentioned in the text of the abstract section, and those who have aided in any way in compiling the material comprising this issue.

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"Whatever tends to irritate and inflame the gum, must in a greater or less degree produce a corresponding irritation in the teeth, from the close connection which subsists between them; and hence the accumulation of tartar, portions of food remaining between the teeth, or any similar circumstance, may possibly become an exciting cause of gangrene [dental caries]; and this, not only by means of inflammation propagated through the gum, but also by the exposure of the necks of the teeth to external agents, in consequence of the absorption of the gum and alveolar processes. The necessity of keeping the teeth in a constant state of cleanliness, and freedom from all extraneous substances, will be particularly insisted upon in another place, but deserves to be alluded to here, as a means of preventing the occurrence of gangrene from the causes just mentioned.

"With the exception of gangrene, there is no kind of injury to which the teeth are exposed, so commonly and so extensively destructive as this concretion. As it is, generally, first of all deposited at the necks of the teeth, and especially underneath the free edge of the gum, its first effect is to excite more or less irritation in that structure, producing increased redness and sensibility, with sponginess and the separation of its edge from the necks of the teeth. As the accumulation increases, its effects keep pace with it; the gum becomes exceedingly painful, so as to render the ordinary operation of brushing the teeth almost impracticable, and thus by inducing a neglect of the common means of preventing its accumulation, it becomes the unavoidable cause of its continued increase. Absorption of the gum and alveolar process is the next consequence, which gradually goes on until the teeth, losing their support, become loosened and at length fall out. . . .

"It has been already observed that the inferior incisors are more particularly liable to this concretion, and hence it happens that, although these teeth are almost entirely devoid of any tendency to gangrene, and are consequently very rarely attacked with that disease, yet there are scarcely any teeth which are so commonly lost as these."

Extracts from *The Anatomy, Physiology, and Diseases of the Teeth.* By Thomas Bell, F.R.S., F.L.S., F.G.S., 1830. PP. 135 and 196.

THE JOURNAL OF PERIODONTOLOGY

JANUARY, NINETEEN HUNDRED FORTY-THREE

Diagnosis and Treatment of Fungus Infections of The Oral Cavity.*

By T. A. HARDGROVE, *Fond du Lac, Wisconsin*

IN a general way, yeast-like fungi and their pathology become an obligation to the practitioner of dentistry, because of his opportunity to recognize and diagnose early the pathology that occurs as a result of the invasion of pathogenic yeast. It is a responsibility because if it is recognized early, it can be cured early. It is a chronic yeast infection that is difficult to handle and many times terminates the life of the patient that could be avoided if an early diagnosis were made and treatment instituted. The older a yeast infection is the harder it is to manage. Among the sources of pathogenic yeast, by all means the most dangerous and likely, are the foods upon which the infection is present. Many times these foods are of the greatest value to our patients. Probably milk is the greatest offender. Raw vegetables and fruits are next in order. Third, the chewing of grain and grass. Decaying wood is a fourth one although not so liable to be an active source of infection. There is danger of contamination by those in contact with livestock and particularly those of the dairy variety. One animal or one individual may have a fungus infection for a long period of time and live in contact with other animals and other individuals without transmitting the disease to them.

The best method of diagnosis is the microscope and culture tube. For culture of the organisms, there are two methods. First, the material can be placed on a slant in the test tube and permitted to grow in an incubator providing the heat used is not too great. The second method is to permit it to grow at room temperature where it seems to grow best. Culture media is important. Savoreud's culture medium still seems to be the one most likely to give a growth. Sugar media permit the growth. A negative result from either of these methods should not be permitted to stop a diagnostic effort. When the material is tested in the incubator some of it should also be placed on the same medium and allowed to grow at room temperature. It may take longer at room temperature, but it is the surest and safest method. Most fungus organisms grow at a low temperature. You may not get a growth in twenty-four or forty-eight hours in some instances, depending on the classification, some of them requiring longer periods of growth than others. Much of the material recorded concerning fungi has been written by pathologists who by nature of their work do not have a great opportunity to observe patients or the result of therapeutic effort. Many times they will report

*Prepared for the 1942 Annual Meeting of the American Academy of Periodontology. (indefinitely postponed).

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that there is no growth or only a slight growth, or if a slight growth is found they may classify it as non-pathogenic. That which is non-pathogenic for one individual may be pathogenic for another. Any diagnostic effort that is not complete is not safe for either the patient or the doctor treating him.

There are many classifications of fungus diseases, and the classification seems to determine one's ability to cure it. Some fungi will yield very readily to treatment while others will resist treatment almost indefinitely, and in some instances completely, so that your patient may lose his life from a fungus infection. Many of these classifications are now made, and particularly by Stovall of the University of Wisconsin, by the way they grow in the culture media. There are as many as one hundred and fifty different kinds of yeast so far classified. Stovall has reduced the number of classifications. In the diagnostic effort, one must not lose sight of the clinical diagnosis. First, the history of the case is most important. The patient will have to be studied, questioned, and memory refreshed, in order to determine the source and type of infection. The smouldering type of infection is the hardest type to cure. The pathologist may give you only the classification of "budding yeast," and this will give you more difficulty and defeat your therapeutic efforts more often than will a classification well-established. The blood finding of the patient is important to determine whether or not a change has occurred in the blood picture. As a general thing, these fungus infections tend to reduce the red blood count and increase the white. Any fungus infection that has lingered over a long period of time is almost sure to cause a change in the blood picture, and if this occurs, supportive treatment should be instituted by the administration of liver extract, or iron, and in some cases arsenic. Liver is probably of greatest value in these cases. The type of infection that we are concerned with in the oral cavity is the one that makes for disease of the mucous membrane, the epithelium, the connective tissue beneath the epithelium, the periosteum and the bone. In a general way that is what is commonly known as thrush.

Thrush, unless well studied, will give the impression of a single type of infection, when in reality a great number of the classifications of fungus are responsible for what we know as thrush. A child whom we have seen in the past with a disease that we were in the habit of calling noma, of such a destructive character that the entire face would be destroyed, and life lost, was due to nothing more than a fungus infection resulting in gangrene and necrosis. In a general way, we can take three main classifications as a basis for the formation of judgment in the treatment of thrush so that thrush becomes a very interesting disease, and passes from a very harmless one to a very dangerous one. Not all of the thrush infections are as dangerous as the above statement might indicate, but any of them neglected may become more dangerous, and cause the death of a patient. First, these infections do not often cause pathology much below the floor of the mouth, and have been said by some writers in the past to never invade the pulmonary tissue, supposedly because the pulmonary excretions are alkaline in character. If that were true, very likely an alkaline treatment would cure most of these diseases. The *Monilia,* and particularly the *Monilia albicans,* does its greatest work on the connective tissue, and in that tissue the reaction is supposed to be slightly alkaline. It is more likely that the reason they do not invade the pulmonary tissue is because of the oxygen tension present in the lung. Oxygen seems to be an influencing factor in the virulence or lack of virulence in the fungus organisms that we know as thrush. You may sometimes, if you are alert, have the opportunity to notice what I have noticed. These fungi penetrate the epithelium and mucous membrane, periosteum and bone, on a free mucous surface like the upper part of the edentulous mandible. I have watched them penetrate through the membrane and into the tissue and then spread out their destructive effect. Before that destructive effect was active, the lesion through which the infection occurred would heal over so that the tissue through which the infection invaded did not look diseased. In some instances it may be red or inflamed. In others, very little, if any, reddening or inflammation is present.

One of the early symptoms of fungus infection is pain of a low grade in a certain locality. If there is pain in a definite locality, whether one sees pathology there or not, persistent over a long period, but not of a very intense character, other things ruled out, one should think of fungus infection, and then that area should be very carefully

watched. One of the first things that occurs is an edema or semi-hard swelling underneath the mucous membrane. It spreads out rather like a lima bean when it is split and many times shaped on top like that. Contact with the finger gives one the impression of a resilient, semi-hard mass. It might exist for three or four days to a month, and during that time the patient may have a low grade pain. It may never make a demonstration at the point of inoculation, but it may cause tissue changes in any part of the body, so that the responsibility of the dentist is apparent. It seldom suppurates or breaks down at the point of inoculation, but may do that later. Then, as the disease progresses, and I am speaking of the *Monilia,* it follows the connective tissue or muscle tissue and makes a demonstration and swelling between the sheath of the muscle and the muscle itself. The edema is immensely large, hard, and board-like so that when palpated it gives the impression of a semi-solid, rubber-like sensation. That is the time to cut into the tissue and one may get a grayish, serum-like exudate, or may not get anything in particular, but at any rate, that is the time to take a culture. Fungi are regarded as an almost constant habitant of the buccal mucosa. They are said to do best in an acid media. It is possible for a yeast infection to remain and resist treatment for twenty-four years in the oral cavity. The writer has seen that occur. A regular white-like deposit that looked like brewer's yeast all over the palate could be dissolved away by the use of acetic acid or peroxide only to return again. The material was embedded deep into the connective tissue, and it was almost impossible to get rid of it. It was another form of fungus infection that does not cause great swelling but gives a white-grayish appearance of the mucous membrane, almost like leukoplakia. This case finally resulted in a squamous cell carcinoma.

Then, there is the *Endomyces vuillemini,* for the purpose of classification, which makes its chief attack on the epithelium, and the less exposed the epithelium is to the free circulation of air, the greater progress the fungus seems to make. If detected early, it responds more quickly than does *Monilia.* It may attack the mucous membrane overlying the nasal ethmoid and sphenoid bones, and destroys them by its attack on the circulation passing through the soft tissue that supplies these bones. In its early stages, *Endomyces* can be easily treated, but if allowed to penetrate too deeply into the accessory cavities, it may get out of control and will find its way back into the brain cavity itself.

Sometimes a biopsy is a good way to make a diagnosis, by direct section, and sometimes by putting the whole material, membrane and all, in the culture tube.

Having outlined these thrush fungus, what are we going to do for the management of them? Since low-grade, smouldering fungus gives us the greatest trouble, it is persistently causing a tissue change without a great demonstration at the point of inoculation. There are two methods of attack. First, because these organisms are in the tissues and cannot be reached by antiseptics, we must find some way of attacking them by internal administration of drugs.

Experience teaches us that iodine is the greatest of any of the drugs that we have attempted to use for this disease. Sulfanilimide may be of value and is reported by some as curing fungus infections, but it is peculiar that sulfanilimide should be of great value when a by-product of actinomycosis, for instance, is sulphur. In its administration, it must be carried to the point of saturation to be of any benefit. If it is sulfathiazole, one dram every four hours if the patient can tolerate it, should be used, but it has not been my experience that sulfathiazole or any of the sulfa drugs are a specific for the yeast-like or fungus infection. Potassium iodide is the drug of choice and has proven its value, and the secret of its administration is to give it to the point of toleration and over a long period of time. How long potassium iodide should be given to a patient is rather indefinite. There is no particular period of time. It is true that the symptoms may all disappear after the administration from one to two or three months, and by discontinuing the drug, the disease, after a short period, returns. It means that the drug has not been administered long enough. From one to six months, and maybe one to six years would be good therapy. These patients should be watched for a period of years. The organisms responsible for the fungus infections will linger in the human system as they linger on the surfaces of any other material, for a long period of time. In the Philippine Islands they have been known to lie dormant in papers concealed in the wall of a church for two hun-

dred years. When the papers were removed, and the fungi permitted to grow on culture, they were as prolific as though they were just beginning their activity; so that in the internal treatment of fungus infections, there must be a persistent effort. The value of the administration of potassium iodide where there is extreme swelling can be intensified by the application of x-ray and radium, because it has a softening and liquefying effect on the entire mass.

The external treatment of fungus infection should be carried on in conjunction with the internal treatment. I know that there are those who hold that potassium iodide alone will cure the disease, and it will in most every case, but the duration of the disease can be greatly shortened and the patient helped by external effort. If you are dealing with an infection that causes a great swelling of the neck and its connective tissue, you must open not only for the purpose of drainage but for the purpose of permitting air to circulate in the infected tissues, and that can be best done by the placing of a drainage tube of large size, the sides of which have been perforated in many places. It will answer for the application of topical remedies as well as for irrigation and drainage. The drug that is of the greatest use is a four per cent gentian violet which can be reduced to a lower percentage and used as an irrigation. The greatest objection to this is its color. It smears up the tissue and makes things look badly, but the staining of the tissues with gentian violet is the very thing that is wanted. Hydrogen peroxide either alone or in association with gentian violet is of great value. These drainage tubes should be washed through with this solution, and at the same time the administration of potassium iodide should be crowded. If the patient complains of the potassium iodide weakening his muscles, it can be discontinued for awhile and then started over by beginning with a larger dose than in the beginning of the previous effort. The administration first should be about two drops four times a day of a saturated solution and increased each day two drops until a maximum is arrived at. These patients who have fungus infections will tolerate heroic doses. The writer has had many of them who have taken without any complaint an ounce of the saturated solution of potassium iodide every day, and they are the ones who have recovered.

Remember always that oral infections have a mixed infection that must be taken care of. A treatment once started for fungus infection that shows any sign of improvement should be continued persistently and heroically until you have controlled the disease; never let your patient get careless or away from you into the hands of somebody who is not familiar with the treatment of fungus infections for the reason that every delay, every interruption, in the treatment of a fungus patient seems to increase the virulence of the disease and the treatment becomes discouraging. The dentist should be familiar with and make use of the following list of therapeutic agents:

LOCALLY	INTERNALLY	THINGS TO BE AVOIDED
1. Gentian violet, 4%	1. Potassium iodide, saturated solution, starting with two grains four times a day, increasing to the point of toleration	1. Cauterization
2. Boric acid and glycerin	2. Arsenic and neosalvarsan in certain cases of monilia albicans	2. Surgical interference except for drainage
3. Hydrogen peroxide	3. Potent liver extract, iron, and arsenic for supportive treatment and correction of blood changes	3. X-ray should be used with observation and caution
4. Occasionally bichloride		4. Violet ray not so liable to do harm
5. Mercurochrome		5. Infra-red not so liable to do harm
6. Merthiolate, but not that which contains alcohol		6. Radium should be used with caution
7. X-ray, Infra-red, Violet ray		

All of these therapeutic agents listed above may be of distinct help in some cases, any of which may be counter-indicated in some cases.

In the case of radium and x-ray, there may be a reaction in the tissue that will make a local lesion harder to handle.

CONCLUSIONS

1. Early and accurate diagnosis.
   (a) Clinical, microscopic, culture tubes in the incubator and at room temperature.
2. Distinction between chronic and acute yeast infection.
3. Early and persistent treatment.
4. Type of occupation.
5. Food contacts.
6. Danger of acquiring the disease from animals.
7. Type of culture media—Savoreud's one of choice.
8. Sometimes one will have to rely on clinical diagnosis.
9. Budding yeast and chronic yeast hardest to control.
10. Danger of change in blood picture.
    (a) Supportive treatment to rebuild a normal blood picture.
11. There are a multiplicity of yeast infections in what we know as thrush.
12. Selective tissues chosen by different classifications of yeast.
13. Low-grade pain one of the first signs.
14. Healing of tissue following invasion through mucous membrane.
15. Drainage that will permit air to the field of infected tissue.
16. Combined treatment of potassium iodide internally and gentian violet externally; x-ray and radium for the purpose of softening mass.
17. Drainage tubes should be large enough and well perforated so as to permit irrigation as well as drainage.
18. The use of the sulfa drugs if you find them of value, and they should be of value to prevent gangrene and necrosis.
19. Potassium iodide should be given to the point of toleration for months and if indicated, for years.

BIBLIOGRAPHY

Stovall, W. D., University of Wisconsin: "Classification and Pathogenicity of Certain Monilias." *Am. J. Clin. Path.* Sept., 1933.

Pessin, S. B., University of Wisconsin: "Classification and Pathogenicity of Certain Monilias." *Am. J. Clin. Path.* Sept., 1933.

Castellani, Aldo, New Orleans, Louisiana: "Fungi and Fungous Diseases."

Lewis, S. J., Beaumont, Texas: "Moniliasis of the Lungs and Stomach." *Am. J. Clin. Path.* Sept., 1933.

Charles Robins—Cited by Stovall.

M. Gubler—Cited by Stovall.

Vogel—Cited by Stovall.

Announcement

AMERICAN ACADEMY OF PERIODONTOLOGY ANNUAL MEETING

BUSINESS SESSION AND LUNCHEON, FEBRUARY 22, 1943

in the

MEDICAL ARTS BLDG., 185 N. WABASH AVE., CHICAGO, ILLINOIS

Raymond E. Johnson,
Secretary

The Occlusal Factor in Periodontal Disease

By HAROLD J. LEONARD, D.D.S., B.A., *New York, N. Y.*

References to the ligation of loose teeth, with gold wire, appear in Roman writing as early as 500 B.C. Galen, in the Second Century A.D., gave directions for filing off high points on the teeth that interfere with mastication and cause looseness of the teeth. John Hunter, in 1771, pictured the injurious shifting of the teeth caused by loss of teeth, especially the lower first molar, and indicated that teeth are loosened when they lose their contact support. The inflammatory nature of periodontoclasia, due to irritating deposits, and its treatment was ably presented by Leonard Koecker of London and Philadelphia, in 1826, W. H. Atkinson of New York, in 1865, John M. Riggs of Hartford, in 1866, Henry Chase of Missouri, in 1871, and their successors. They apparently had very little appreciation of the role of occlusal stress on the teeth in its relation to periodontoclasia.

The first comprehensive study of this subject was by Eugene S. Talbot in his book, *Interstitial Gingivitis,* in 1899. He showed that modern man is predisposed to disease of the supporting tissues of the teeth, because the function of jaws from infancy up is greatly decreased as a result of modern methods of preparing food. The teeth tend to have smaller crowns and longer roots with thin supporting bone, in contrast to races with heavy occlusal function in which the crowns are wide and heavily contoured, the alveolar process and septal bone thick, the palate vault low, and the arches wide. In modern man, not only is the supporting bone thin in its formation, but the tendency to disease is increased throughout life by the poor blood supply to the tissues as a result of slight masticatory function. He believed the alveolar bone to be less resistant to irritation and solution than bone elsewhere in the body, due to its transitory nature as a support for teeth which are constantly shifting in the jaws. He says:

> When more work is required of one tooth (as when the dental arch is broken by the loss of one or more teeth and the others have moved out of their normal position, or when a seamstress bites her thread with one or more teeth, or when plates are attached or come in contact with natural teeth, or when a piece of bridge work is adjusted) and the roots of one or two teeth must support or do the work of a greater number, this character of adventitious tissue structure predisposes to inflammation about the root or roots of the teeth. . . . Understimulation also predisposes to inflammation.

Talbot recognized that periodontoclasia is caused by infection resulting from bacterial deposits at and beneath the gingival margins. Lowered resistance to such infection may come from several systemic causes which he names. But undue strains on the tooth roots produced by excess occlusal stresses, taken in conjunction with the weak alveolar support of modern man greatly predisposes the periodontal tissues to infective inflammation, which in turn causes rapid solution of the transitory bone structure. Talbot noted also that the chief method of bone solution in periodontoclasia is halisteresis; that is, solution and disappearance of bone salts without the immediate loss of the bone matrix. He concluded that treatment designed to rid the tissue of irritation and infection would permit the reformation of bone, in so far as the matrix remained for the incorporation of salts. He disapproved, therefore, of curetting beyond the pocket depth as advocated by Riggs, or of injuring the remaining tissues any more than necessary in getting the root surfaces clean.

W. V. B. Ames, in 1903, and F. Primrose, in 1906, advocated the use of fixed bridgework as a means of stabilizing teeth which had loosened because of loss of mesiodistal support. Clarence J. Grieves, in 1906, showed how settling partial dentures act as wedges to loosen the teeth to which they are clasped. Paul B. H. Quedenfeld of Buffalo, in 1908, stated that he first heard about malocclusion as a cause of pyorrhea five years before from Dr. Karoly of Vienna. Since then he had been studying the subject and had come to the conclusion that occlusal factors are responsible for more than sixty per cent of all pyorrhea alveolaris. He listed the effects of the loss of the lower first molar and noted the injurious traumatic effects of biting on pipes, threads, or fingernails, or grinding the teeth at night. He advocated opening the bite in cases in which vertical dimension was decreased because of loss of molar teeth and in which the ante-

riors were being traumatized by excessive overbite.

In 1912, Clarence J. Grieves again condemned partial dentures and removable bridges, as ordinarily made, because they permitted sufficient play so as not to splint the abutment teeth.

While the crown and bridge authorities contributed much to the knowledge of the stabilization of teeth loosened by occlusal stresses during this period, the periodontists did little other than suggest grinding to relieve teeth which were being traumatized.

Students of the periodontal membrane, like G. V. Black, recognized that loss of contact of teeth led to gingivitis and periodontoclasia between the teeth, but ascribed it altogether to food impaction. The shifting of the teeth following extraction was ascribed to the pull of the transceptal fibers in the healing extraction wound.

Paul R. Stillman is probably more responsible than any one else for calling attention to the role of traumatic occlusion as a predisposing cause of periodontoclasia. Starting in 1917, he presented a series of papers in which he was soon joined by John Oppie McCall. Together they obtained the coöperation of Harold K. Box, of Toronto, who continued the study from the histopathological standpoint and subsequently enlisted the aid of engineers and anthropologists.

FUNDAMENTAL BASIS OF LOW RESISTANCE

All the studies of skulls of primitive and modern man indicate that powerful occlusal function leads to well developed jaws, teeth in regular alinement, and freedom from periodontoclasia. Conversely, slight function from infancy up leads to weak maxillae and mandible, frail thin alveolar process, a tendency to irregular and crowded teeth and eventual loss of teeth from periodontoclasia if not from caries. These changes in structure appear to take place rather rapidly.

L. M. Waugh in his recent studies of Eskimos shows that great changes have occurred in very few generations. Eskimos who have had contact with traders for many years and have used imported foods and gotten away from the dried and frozen meat diet, which requires tremendous masticatory function, have very bad teeth. Irregularity is very common and caries and periodontoclasia almost universal. The Eskimos who still live on the frozen meat diet have tremendously developed jaws with no irregularity from crowding and no periodontoclasia. The teeth are frightfully dirty and salivary calculus accumulations are often great. These irritants often cause gingival and alveolar recession even to the point where the teeth are lost, but Waugh states he never finds periodontal pockets or true periodontoclasia in the Eskimos living on the primitive diet. (*See* p. 36.)

Waugh measured with a gnathodynamometer the biting strength of great numbers of the Eskimos who had always lived on the primitive diet. He found the average strength between two and three hundred pounds with some as high as three hundred and fifty. Even children of twelve had biting strengths of two hundred and fifty pounds. The average biting strength of college students according to studies by P. J. Brekhus, in 1937, is one hundred and twenty-five pounds with few over one hundred and fifty. This comparison gives an important indication of the reason for well developed jaws with freedom from susceptibility to periodontoclasia on the one hand and on the other weak jaws, frail alveolar support, irregular crowded teeth and susceptibility to periodontoclasia.

The findings of Waugh in regard to Eskimos, confirm earlier findings of Charles Darwin, T. H. Huxley, E. S. Talbot, H. L. Wheeler, F. H. Orton, and many others, who have studied skulls and living men under different environmental conditions and have concluded that decreased masticatory function leads to less vigorous structure of the supporting tissues of the teeth and less resistance to disease of these tissues. W. R. Pond of Rutland, Vermont, in 1914, noted what has been many times observed since, that immigrants who retain the diet of coarse food of their native peasant conditions, continue to have good teeth while those who change to the soft American diet very soon develop caries, gingivitis, and periodontoclasia.

T. B. Hartzell, in 1911, quoted Huxley as saying that "the lower jaw is the most interesting bone in the body for it is the first organ to show changes in the habit of the animal."

Hartzell further says:

An example of how readily changes in habit beget changes in structure is furnished by the Yorkshire

pig, now noted for its short nose and flat round face. It is the direct descendant of the wild boar whose snout was large and whose jaws contained great tusks. Our razor back hog in the southern states with its long snout and swift gait is a descendant of the Yorkshire pig, showing a double change and reversal toward the type of its earliest ancestors when placed again in an environment demanding the exercise of powers similar to those which produced the wild boar.

Another factor that may contribute to freedom from traumatic occlusion and periodontoclasia, on the part of people with heavy masticatory function, is occlusal wear. Occlusal wear always occurs to some extent where the teeth are vigorously used but its rapidity depends greatly on the amount of abrasive grit in the food. Wear occurs mostly on the milling cusps, that is, the lingual cusps of the upper posterior teeth and the buccal cusps of the lowers. The buccal cusps of the uppers are worn only on their lingual aspects and the lingual cusps of the lowers on their buccal aspects so that the level of these cusps is retained while the opposite cusps may be worn completely away. Such a wear brings lateral strains on the posterior teeth but this may be compensated by the shortened crowns of the teeth and by the development of strong bone and periodontal ligament.

Occlusal wear also affects the anterior teeth. Harry Campbell, 1925, J. Cameron, 1934, and Sir Arthur Keith, 1924, have shown that the slight overbite which is present in young well developed jaws is soon worn away on a gritty diet and by the time of maturity the anterior teeth assume an end to end relationship. Occlusal wear thus shortens the crowns of the teeth and increases the mechanical advantage of the roots and at the same time removes outstanding points of any teeth which may interfere with the free movement of the jaws. The masticatory load is evenly distributed and ample time is given for the development of support to offset the strong lateral thrusts on the abraded posterior teeth.

Where grit is absent from the diet and masticatory function is slight, the anterior teeth are seldom worn to an end to end relationship and interfering points do not get worn away. As the alveolar bone gradually recedes during the life time, the unworn clinical crown lengthens as the clinical root shortens with increasing mechanical disadvantage to the supporting structures.

Heredity probably plays an important part in creating conditions in the jaws which are mechanically productive of disease. An inheritance of a larger upper jaw from one parent and a small lower jaw from the other, or of large jaws from one and small teeth from the other, or large teeth from one and small jaws from the other, are examples. C. R. Stockard, 1932, in his studies of the inheritance of genetic characteristics has shown that these conditions are possible and do occur when mates are of widely divergent types. The mixture of races in the United States is about as great as it can be and undoubtedly this accounts for many of the anomalous orthodontic conditions which present themselves. In many of these cases it is impossible to adjust the occlusion so as to eliminate excessive strains from the teeth.

The fundamental reasons for the trend toward poor development and lack of resistance to disease of the periodontal structures in modern Americans in contrast to those in more primitive environments are threefold:

1. Insufficient masticatory function from early infancy up. Even young infants are deprived of the developmental function of nursing, by getting their food from a soft rubber nippled bottle. After the nursing period, they get cooked cereal and strained vegetable and never thereafter have to use their teeth and jaws in the way for which they are adapted. The result is underdeveloped jaws, crowded irregular teeth, frail, thin alveolar process, and weak periodontal ligaments. There is not enough function to maintain a vigorous blood supply to the periodontal tissues and they are easily invaded and quickly break down when infection starts in the gingival sulci.

2. The lack of grit in the modern diet and the insufficiency of masticatory function do not cause the teeth to wear down to an end to end bite in front or to wear off the interfering cusps and corners which are present, especially if the teeth are crowded and irregular. The gradual recession of the alveolar margin as age advances magnifies the length of the clinical crown in ratio to the clinical root and increases the strains which interfering points create.

3. The mating of widely differing types in the United States, due to the great admixture of races, often leads to faulty relations between the sizes of jaws and teeth, many cases of which create insurmountable difficulties to the establishment and maintenance of function and health.

HISTOPATHOLOGY OF OCCLUSAL TRAUMA AND ITS RELATION TO PERIODONTOCLASIA

Periodontoclasia is an infectious process in which the ordinary bacteria of the mouth, the streptococci, the staphylococci and the oral spirochoetes invade the gingiva at the base of the sulcus to cause chronic inflammation. As the white fibrous connective tissue of the pericementum is disintegrated by this inflammation the sulcus epithelium is stimulated to grow from the amelo-cemental junction rootward along the cementum. Such epithelium is easily split under the inflammatory conditions to create a deepening of the gingival sulcus into a periclasial pocket. Exudates from the inflamed sulcus and pocket form deposits on the root, which act as continuing and advancing sources of irritation and infection. When the bone margin becomes involved in the zone of inflammation, halisteresis of the bone occurs in which the bone salts disappear, leaving the bone matrix intact for a time until it too is destroyed. This, in brief, is the pathological process when the disease is due simply to unhygienic conditions about the teeth. The progress of pocket formation and bone absorption is rather even except where food may impact to aggravate the insanitary condition and hasten locally the progress of inflammation. Systemic conditions such as vitamin deficiencies, endocrine imbalances and systemic poisons undoubtedly play an important part in this process by altering the structure and chemistry of the connective tissues, epithelium, and blood vessels, making them more vulnerable to bacterial invasion or by increasing the deposit of irritating material on the teeth. The process is simply part of the eternal warfare between living tissues, on the one hand, and bacterial invaders on the other. It is easily treated by creating and maintaining sanitary conditions about the teeth and by building up local gingival tissue tone with tooth brush massage.

A totally different histopathological picture is presented by occlusal trauma. When a tooth is moved in its socket in excess of the amount permitted by its suspensory ligament, the periodontal membrane, an irritation occurs on the compression side due to injury to the periodontal membrane which is crushed between the tooth root and the alveolar wall. This irritation leads to mild inflammation which causes the bone along the alveolar wall to be resorbed together with the principal fibers of the periodontal membrane in that area. Areas of actual necrosis and hemorrhage occur if the traumatic stress is more than mild. According to Harold K. Box (1924), the injured areas are altered by the proliferation of fibrillar connective tissue about the blood vessels, at the expense of the normal white connective tissue, periodontal fibers, and bone. The blood vessels are partially occluded in this degenerative metamorphosis. If the tooth gets no further movement, or if it can shift into a position where occlusal forces no longer cause excess movement, then healing occurs with the development of new principal fibers imbedded on one end in a new layer of cementum, and on the other in new bone formed in response to the function of the fibers.

As traumatic stresses usually occur, however, the tooth is given no relief. The traumatic stress moves it out of position during excursive movements of the jaw while the pressure of the lips, cheeks, tongue, and opposing cusps tend to restore it to its original position between times. Under such conditions it has no opportunity to heal. A thicker than normal cortical plate of bone may be built up on the alveolar wall at a distance from the root but the periodontal membrane remains in an unstable condition with large areas of the periodontal membrane replaced with fibrillar connective tissue in which blood vessels are partially occluded.

The area of most intense change is, of course, at the alveolar border where the movement is greatest. B. Gottlieb (1928) has shown that the resorption of principal fibers, adjacent to the band of epithelial attachment of the gingiva, permits a proliferation of the epithelium rootward. Such a proliferation predisposes to deepening of the gingival sulcus into a pocket in that area of infective inflammation, or mechanical tears tend to split the epithelium. Pocket formation by reason of epithelial proliferation, however, is probably not so important in these cases as pocket formation by reason of bacteria which burrow their way from any gingival infection into the areas of damaged periodontal membrane. Just as bacteria, if they can gain entry, will cause infectious inflammation anywhere in the body where the tissue is damaged and its resistance is low, so the long islands of fibrillar connec-

tive tissue in a traumatized periodontal membrane permit rapid invasion and deep infection. The inflammation set up by such invasion causes further destruction of principal fibers and alveolar bone and permits proliferation of epithelium and finally pocket formation deep along the root.

This conception of the role of traumatic occlusion which we owe to Stillman, McCall, and Box, is completely in accord with the everyday findings in clinical practice. It explains why we nearly always find deep periodontoclasia and alveolar destruction in mouths where shifting of the teeth is occurring, due to tooth loss, and where hygienic conditions are not sufficiently perfect to keep bacteria out of the gingival tissues. It explains why we nearly always find pockets most advanced on the side toward which the tooth is moved in the injurious stress, unless food impaction has complicated the picture on the tension side. It also explains why orthodontic movement, which is a controlled pressure that permits building of new bone on the tension side practically as fast as it is absorbed on the compression side, and at no time permits destructive to and fro movement of the tooth in its socket, does not ordinarily lead to periodontoclasia.

There is little if any room in this concept for the idea of B. Gottlieb, B. Orban, R. Kronfeld, H. Becks, and others, that the deep bone destruction, seen so often about the tooth in advanced periodontoclasia and named by them diffuse alveolar atrophy, is a systemic bone disease where effects are limited to the alveolar process. The cases that cannot be explained on the basis of infection alone, or infection combined with occlusal trauma, or atrophy due to lack of occlusal function, without bringing in some obscure bone disease that attacks only the alveolar bone, are so few as to be negligible. It is possible, even probable, that certain systemic conditions unfavorably influence the tearing down and building up of alveolar bone which goes on throughout life and which are particularly active if teeth are shifting in their positions. Leriche and Policard (1928) have shown that an attack of influenza will quickly break down the callus formed in a healing fracture wound. It is probable that in some systemic conditions, the breaking down process is hastened and the building up process hindered. It is conceivable that this might appear more markedly in the alveolar process where bone changes are more active due to shifting of the teeth than elsewhere in the body. Leriche and Policard have shown that bone built in mature connective tissue is less stable than membranous bone. Alveolar bone is certainly built in mature connective tissue. This fact probably accounts for the observations that led to the theory of Talbot that the alveolar process is a transitory bony structure and therefore less stable and resistant to slight resorptive influences than skeletal bone elsewhere. While it must be granted that the possibility exists of deleterious systemic influences aiding in the breaking down of alveolar bone without marked bone changes elsewhere, it is seldom necessary to fall back on this hypothesis in actual practice. The causes of alveolar breakdown are for the most part local and can be treated adequately by local dental treatment alone.

CAUSES OF TRAUMATIC OCCLUSION

The most frequent cause of traumatic occlusion is undoubtedly the unrestored loss of a posterior tooth. Of those, the loss of a lower first molar causes the most destructive results. These results have been enumerated time and again, but do not appear to have impressed the profession, for it is common experience to find patients who have been given regular dental care by prominent dentists and periodontists, and yet who exhibit the progressively destructive effects of a missing lower first molar, and have never been advised of the necessity for replacement. The effects are shifting of the teeth with resulting food impaction areas, extrusion of the upper first molar, difficulties in sanitatión, closing of the bite, crowding of the tongue, possible temperomandibular joint and middle ear difficulties, speech defects, bad appearance, difficulties in mastication, and traumatic occlusion. The last item is the most important one to the subject of this paper.

The teeth are held in line by the cheeks, lips, tongue, and the occlusal surfaces of the opposing teeth. There is apparently a pressure from the rear, the exact nature of which is unknown, which pushes the lower posterior teeth forward, so that the wear, going on throughout life at the contact points, is constantly compensated by the mesial drifting of the teeth. In this way the posterior teeth remain in firm contact through-

out the life time, barring accidents, and thus support each other against mesiodistal movement caused by pressures of the opposing teeth in function. The teeth erupt until they are in equilibrium with the muscles of mastication. If excessive wear occurs on certain teeth, these teeth tend to erupt gradually to compensate for the wear. If a cusp or point interferes with the excursive movements of the jaw in a well functioning occlusion, either the interfering point is worn off by attrition, or the tooth shifts in its position so as to be in equilibrium. The forces balance each other to maintain a functional occlusion during the life time. The alveolar bone builds itself around the teeth at the time they erupt and adapts itself to the function to which it is subjected. If the function is great, the bone becomes heavy and dense around the roots to support the strains on the alveolar ligament or periodontal membrane. If there is very little function, the bony supporting plates behind the alveolar shell or *lamina dura* may disappear and the periodontal membrane lose its ligamentous structure. In a well functioning occlusion the bone and periodontal membrane are sufficiently strong to withstand the buccolingual horizontal stresses of mastication even when occlusal wear creates interfering cusps.

The compensatory mechanism is destroyed in most cases when a lower first molar is lost. The forces of occlusion on the lower second and third molars aided by the unknown force from the rear tilts these teeth which have lost their mesial support, forward and lingually. In their tilted positions their periodontal membranes no longer withstand the occlusal pressure on their whole extent as from a straight intrusive force, but in certain parts only, due to a horizontal force from the buccal and distal. Certain fibers are stretched unduly while other portions of the periodontal membrane are compressed. This occurs while the tooth is rapidly shifting its position in the bone and the periodontal membrane has had no chance to become stabilized. The periodontal membrane is thickened in the areas of greatest movement because of bone resorption from pressure. Every stroke of occlusion moves the tooth in a mesial and lingual direction from which it springs back after the pressure is withdrawn. The periodontal membrane at the neck of the tooth on the mesial and lingual is greatly damaged, the principal fibers being largely replaced with fibrillar connective tissue, and the blood supply altered and impeded.

The tilting of the tooth makes cleansing of the mesial and lingual surfaces difficult, and these surfaces are usually not well cleansed even in mouths where home care is conscientious and otherwise good. A bacterial mat grows on the tooth surface next the gingiva and brings on gingivitis on the mesial and lingual sides of the tipped teeth. This gingivitis gives rise to a gingival exudate which furnishes pabulum for further bacterial growth, and also leads to deposits of subgingival cuculus. Bacteria penetrate to reach the areas of damaged ligamentous tissue underneath, after which rapid invasion leading to deep periodontoclasia follows. Inflammation deep down on the roots tends to heave the tooth out of its socket so that it interferes more than ever with masticatory movement. The loss of attachment, the result of infectious inflammation, also permits further mobility with increasing injury to those portions of the periodontal membrane and alveolar bone not hitherto seriously injured. The combination of pathologic factors leads to the inevitable loss of the tooth unless periodontal and prosthetic treatment intervene to eliminate infection and stabilize the tooth.

The loss of the lower first molar, followed by the tilting of the second and third molars, permits a closing of the bite or lessening of the dimension between the upper and lower jaws. The molar teeth in their upright position oppose fully the muscles of mastication, but when tilted they no longer do so. The closing bite brings increased occlusal stress on the bicuspids. The lower bicuspids, lacking support distally, tend to drift to the distal and to separate from each other and from the lower cuspid. For a time in this drifting, they are in end to end relation with the uppers in the mesiodistal relation, at the time that the vertical dimension is decreased. Under these conditions either the upper or lower bicuspids, whichever have the weaker support, become intruded, that is, driven more deeply into their sockets. The bicuspid roots are not sufficiently large and well supported to withstand the full force of the muscles of mastication, especially at a time when drifting is taking place, and the perio-

dontal membranes are in an unstable condition. The lower bicuspids may be tilted, or may drift without tilting, and may be rotated, depending on the direction of the occlusal forces which play on them. In any event, the periodontal membranes are kept in a continuous state of change and, like the tilted molars, are susceptible to deep periodontoclasia starting from any gingival bacterial invasion that may be present.

The decrease in vertical dimension and distal drifting of the bicuspids give rise to shifting relations on the anterior teeth. The pressure of the lips and upper teeth against the unsupported lower anteriors causes a lingual tilting and distal drifting of these teeth. The overbite is increased until frequently the lower incisors are touching the lingual gingiva of the uppers. This gives rise to food impaction with deep periodontal pockets on the lingual of the uppers. It also gives rise to great labiolingual strains on both the upper and lower teeth. Any projecting point like a rotated lower incisor, a corner of which stands labial to the arch line, brings great strain on this tooth and also its upper antagonist. The lips and tongue hold the teeth in line between masticatory movements while the interfering corner markedly moves the two teeth concerned during masticatory movements. The periodontal membranes, on the sides where compression occurs from the movement, become damaged and susceptible to bacterial invasion and deep periodontoclasia.

The loss of the lower first molar affects the upper posteriors by permitting extrusion or downward growth of the upper first molar. If the palatal bone is thin on this tooth and the roots widely divergent, a very little of such movement carries the palatal root out through the bone. This may lead to deep palatal gingival recession, or periodontoclasia, to the apex of the palatal root, with devitalization and abscess formation, while the two buccal roots are still stable with vital pulps. Even without denudation of the palatal root, the lack of occlusal function on this tooth brings about degenerative changes in its pericementum which predispose it to periodontoclasia. Bacterial infection enters usually on the proximal surfaces due to food impactions.

The second and third upper molars become involved in periodontal changes because of the shifting direction of stresses brought to bear on them by the tilting lowers. Every shift in direction of stress creates a need for new arrangement of fibers and supporting bone. These changes are brought about only by resorption of fibers and bone which are being compressed and the growth of new fibers and supporting bone to resist tension. If these changes are prolonged and the periodontal membrane remains unstable over a long period of time, there is opportunity for attack by bacterial infection if bacteria are present in the gingival tissue. The upper second and third molars are commonly as badly affected by periodontoclasia in cases due to loss of the lower first molar as the other teeth which actually are shifted much more.

This exposition of the traumatic effects on the teeth following the loss of a lower first molar is not to imply that the loss of this tooth always leads to these effects. In well worn cases in which the cusps are gone and the occlusal surfaces are flat in a mesiodistal direction, it frequently happens that no shifting occurs following the loss of a lower first molar. End to end bite cases and those with crossed bite do not tend to force the lower teeth into the space left when the lower first molar is lost, and except for slight extrusion of the upper first molar there may be no appreciable shifting of teeth over a great many years.

The traumatic effects of the loss of the lower first molar have been detailed because this is one of the most common causes of the eventual loss of the teeth from periodontoclasia. P. J. Brekhus (1928) has shown that over forty per cent of Americans by the age of twenty have lost one or more lower first molars and nearly seventy-five per cent by the age of forty. Most of these spaces are not bridged and the end result is the gradual loss of all the teeth. The loss of any tooth which permits shifting of the remaining teeth and changing directions of stress, especially mesiodistal or labiolingual movements from which the tooth can not become stabilized, invites deep periodontal infection and loss of teeth.

Loss of teeth and wear of teeth which bring changes in directions of force on the teeth and interferences in masticatory movements from which they cannot find positions of stability, are not the only causes of trau-

matic occlusion. Orthodontic defects often leave teeth in positions where they are subjected to increasing traumatic movements. The lingual inclination of the upper anteriors permits a gradual extrusion or continuous eruption because the lowers do not occlude with the lingual eminences of the uppers in the rest position. There is a gradual telescoping of the bite in front resulting in increasing interferences with the normal masticatory movements on the posterior teeth. This brings great strains on the anteriors and often leads to mobility in these teeth. Mobility indicates the changes in the pericementum which, as has been shown, open the way for deep periodontal infection and destruction.

Many mouth habits cause shifting of the teeth or mobility with similar consequences. A habit of locking the jaws hard at night, which many people have who are under nervous tension of one kind or another, is very vicious. Such a habit accounts for many of the cases where the occlusion and hygiene seem good yet all the teeth are mobile and many show deep periodontoclasia or losses of alveolar bone. Some persons acquire the habit of pushing against the anterior teeth with the tongue, as a result of which the arch is enlarged and the anterior teeth become separated. Thread biting, nail biting, or any habit that pushes some one tooth from time to time out of its normal position in relation to the other teeth, may cause chronic injury of the pericementum of that tooth and open the way for periodontoclasia.

SIGNS AND SYMPTOMS OF TRAUMATIC OCCLUSION

Any tooth which shows a thickened line of pericementum, a destroyed *lamina dura*, or an abnormally thickened *lamina dura* in the radiograph, or is abnormally mobile, or has a deep periclasial pocket about it, when the rest of the mouth is comparatively free, should be suspected of being in traumatic occlusion. It should be particularly suspected if, after periodontal treatment to get the root surface clean and smooth and home care treatment to maintain sanitation and build up circulation and tissue tone by massage, a pocket refuses to heal. Stillman has said, and the author agrees with him, that it is impossible to rid the periodontal tissue of infection by conservative treatment and get healing while the pericementum continues to be traumatized by excessive movements of the tooth due to occlusal stresses. Extreme soreness at the base of the pocket is a symptom of occlusal trauma, although this symptom may also be due to the activity of Vincent's organisms in the pockets. Tenderness to biting stress, and hypersensitivity of the tooth to cold when there is no exposed dentin to account for it, are common symptoms. An overhigh filling or crown that causes injury to the apical pericementum may produce symptoms which we have always been taught to believe go with a dying pulp. Hypersensitivity to heat, toothache at night, and unlocalized neuralgic pains radiating along the branches of the trigeminal nerve are frequent symptoms which are quickly relieved by grinding the offending restoration into adjustment with the general occlusion. Stillman, McCall, and Box have listed a large number of gingival signs which may be due to traumatic occlusion but it is not necessary to know these in order to identify the condition. Clarence Simpson, in an address before the American Academy of Periodontology in 1938, showed a series of radiographs of periapical radiolucencies exactly similar to periapical granulomas from pulp infections, that were proved to be produced by traumatic stresses on the teeth.

TESTS FOR TRAUMATIC OCCLUSION

The tests for traumatic occlusion, when it is suspected, are fairly simple. Sight along the upper teeth while the patient rather rapidly moves the jaws back and forth in various excursive movements and see if the suspected upper tooth moves out and in, in relation to the adjacent teeth. If it is an anterior tooth, place the finger on the suspected upper tooth and an adjacent tooth and have the patient attempt to bite on that tooth. If a definite thrust can be felt, it indicates traumatic occlusion. It is usually impossible to see or feel the lowers move in this way, but if a lower tooth is showing signs or symptoms of occlusal trauma, the opposing upper tooth will show movement to the test. It frequently happens that a lower tooth, while apparently firm and well supported, is uncomfortable to the patient while the upper, which is mobile and being moved in some excursive position, exhibits no subjective symptoms whatever. These tests are useful for buccolingual or labiolingual trau-

matic stresses, but not for mesiodistal. For the latter it is enough to find the signs in the radiograph and in the gingiva and then determine that there is insufficient contact support.

Study casts are really essential in a large proportion of cases for an intelligent investigation of the subject. These should be made from hydrocolloid or trulastic impressions so as to obtain exact occlusal detail. There is no need to mount these in an anatomical articulator with face bow measurement and check bites, since such procedure will not give enough more information to pay for the many hours of laboratory time it entails. The function of study casts is to show what is going on in the dentition. If teeth are missing, it is easy to see how the other teeth have shifted. If the teeth are worn down, the presence of outstanding unworn cusps which must interfere with lateral excursion will at once be evident to account for mobility, or for actively advancing periodontoclasia on the buccal or lingual sides of the teeth. The worn areas give evidence as to where stresses are occurring, which may have become too great to be compensated by attrition and strongly developed periodontal ligaments. The manner in which the cusps interdigitate will give clues as to wedging action which in many cases is responsible for food impaction, or separation of teeth, or for active proximal periodontoclasia. Besides these observations, which only suggest the value of study casts in investigating the stresses on the teeth, such casts are essential in designing the reshaping of teeth, restorations, replacements, and splinting devices for offsetting and counteracting the destructive forces.

GRINDING TO OFFSET OCCLUSAL STRESSES

Much too much emphasis has been placed on grinding as a means of treating traumatic occlusion. Grinding is an essential part of treatment, especially as a means of temporary relief, but it will not permanently compensate for the shifting of teeth where contacts are lost, and especially where shifting is due to a space created by a missing posterior tooth. It is easily carried so far as to create a new occlusal level with new directions of occlusal force brought to bear on all the teeth, a condition that will make the teeth uncomfortable for many months or even years.

The very extensive grinding under the name of "occlusal equilibration," which is being practiced by many periodontists, may be, in part, due to the teachings of Box. As stated earlier, Box finds that in older persons with well functioning dentitions, the teeth are worn so that the anteriors have an end to end bite and the posteriors are practically flat on their occlusal surfaces. He believes that this type of occlusal wear largely eliminates horizontal stresses on the teeth and greatly increases intrusive stresses with attendant development of strong healthy periodontal ligaments. According to this teaching Nature should be aided in cases where natural wear has not created this result, by grinding the incisal edges, and cusps of the posteriors until a result similar to natural wear in primitive jaws is brought about.

The effect of this extensive grinding operation as seen in patients is frequently disastrous. The bite has been closed, since in such a sudden action the teeth have not had time to extrude to accommodate to the shortening and to adjust to the length of the muscles of mastication. The position of centric occlusion has been lost in the rest position. The periodontal ligaments are given a suddenly increased load in the intrusive direction due to the new milling function rather than the shearing one which they had when long cusps were articulated. All the periodontal membranes are uncomfortable due to the new directions of stress on them. Many occlusal surfaces are sensitive because new areas of dentin have been uncovered and exposed to irritation. The patients feel that they look older, there is not room for the tongue, they cannot find a natural position of rest for the teeth, all their teeth are lame and many are sensitive, and they do not chew easily or speak naturally. The irritation is enough to put some of them into a pitiable nervous condition. It often takes a year for sufficient adjustment to take place so that the teeth feel comfortable and some patients complain about loss of a natural rest position even after several years. The beneficial effects on the periodontal tissues, if any, are certainly far more than offset by the disastrous effects in other ways, especially in view of the fact that such extensive grinding is unnecessary in order to establish and maintain the health of the periodontal tissues.

The least possible grinding that will eliminate cusps and corners which create undue lateral stresses on the teeth should be done.

Teeth that are loose or have but little remaining attachment may have cusps rounded and sluiceways deepened as a means of decreasing their individual loads. Disoccluding a loose tooth is seldom advisable since the inflamed periodontal membrane soon heaves the tooth out sufficiently to bring it into occlusion again. If teeth are loosened as a result of a closing bite and shifting teeth due to the loss of a posterior tooth, the relief of the traumatized teeth must usually await replacement procedures which stabilize the occlusal level and prevent further shifting. Interfering cusps and corners can then be ground with some confidence in permanent benefit.

Grinding should be done in such a way as to reduce irregularities from the normal lines and curves of the occlusal surfaces of the teeth. If a lower anterior is rotated with a corner standing forward of the line of the adjacent teeth and the upper tooth is being loosened, it is the lower that should be ground, not the upper, although the lower may show no traumatic effects. Similarly, if lateral excursive movements create thrusts on posterior teeth, the grinding is done on the cusps which are interfering whether or not they are on the traumatized tooth. Grinding should be in line with restoring the curvature of Spee and the lateral occlusal curvature. The use of carbon paper as a means of finding spots to grind is not highly satisfactory as the usual end result is to disocclude the tooth. The author has found a thin strip of softened black carding wax pasted over the dried surfaces of the teeth which seem to be out of ideal mechanical relation, a more satisfactory method of determining the points to grind. The patient bites through and articulates against the wax and leaves impressions which indicate how the opposing cusps are interfering. By the judicious use of this means, grinding can be done to eliminate points which interfere with articular movement without disoccluding the teeth.

LIGATING

Ligating teeth with stainless steel wire is sometimes necessary in order to stabilize a tooth, or several teeth, temporarily, so that healing can take place. It is especially indicated on loosened protruded upper anteriors after the bite on the posteriors has been opened sufficiently to relieve the anteriors of direct traumatic stresses. By tightening the wires passing from cuspid to cuspid and attached between all of the anteriors, over a period of weeks, it is frequently possible to draw these teeth together and inward so as to improve the appearance and restore the anterior articulation on the new occlusal level. At the same time the teeth are being held firmly by the wires and prevented from being thrust back and forth by food biting, until new pericementum and bone can grow in and anchor them firmly. Ligation is a temporary expedient and method of treatment, not a permanent method of splinting. It should be practiced only when the occlusal level has been stabilized and interfering points adjusted. To tie a group of loose teeth, which continue to receive lateral thrusts in any of the articular movements, to firm teeth will only result in loosening the firm anchor teeth without helping the traumatized teeth to heal. Ligation with stainless steel wire as now practiced need cause very little difficulty with sanitation such as might lead to carious areas or continued gingivitis.

FIXED BRIDGE WORK AND CONTACT INLAYS

A very large proportion of periodontoclasia is due to lack of contact support on posterior teeth. Careful observation will convince anyone that pockets occur on the proximal surfaces more frequently than on the buccal and lingual. Not all of these, by any means, are caused by food impaction or Vincent's infection, acute or chronic. A great many result from excess mesiodistal movement of the teeth in their sockets during articulation because of the fact that contacts are not tight and the teeth do not support each other. It will frequently be found by careful test that such teeth have considerable mesiodistal mobility when no buccolingual mobility can be detected. It is an essential part of periodontal treatment that contact support should be given posterior teeth whenever it can be determined that mesiodistal thrust is being given them in any of the articular movements, or the teeth are shifting due to spaces between them, or foods tend to be impacted into such spaces. It is safer to build in contact support by restorations in sound teeth where contacts are weak even though no disease is yet apparent, than to wait for disease to occur.

It is not enough to build contact support

between teeth which are markedly tilted toward each other. A long contact on a tilted second lower molar no matter how tight against a second bicuspid, will still act as the end of a cantilever bridge and will slide up and down on the distal surface of the bicuspid and permit undue movement on the periodontal structure of the second molar. A Nesbit bridge inserted between two teeth tilted toward each other will not stop a mesiodistal movement of the tilted teeth within the framework of the clasps. The more rigidly such teeth can be fixed against further mesiodistal movement the better. Even the popular broken stress bridges are insufficient support in these cases. A bridge attached to a tilted lower second molar with a lug in a lug rest in the second bicuspid will generally develop sufficient play of the lug in its rest in a short time so as to fail as a stabilizer for the second molar. The reverse type of appliance in which the bridge is attached to the bicuspid with a lug in a lug rest in the tilted second molar completely fails to prevent the second molar from getting an injurious mesial thrust during masticatory motions. Teeth tilted toward one another should be fastened together by a bridge rigidly fixed at both ends even though there is no space between them for a pontic. A fixed bridge for posterior teeth should be considered primarily as a permanent splint to prevent mesiodistal movement of the teeth, further shifting, or lowering of the bite level. It is as essential a part of periodontoclasia treatment as the cleaning of root surfaces and establishment of hygiene.

The teaching of Herman Chayes (1917) that teeth should not be fixed together, but left free to have their own independent movements and oscillations, has been productive of much harm in this author's opinion. Teeth do not need lateral or horizontal or tortional movement in order to maintain the periodontal ligament in health. Vigorous mastication, even if all the teeth were fixed firmly together, would still produce motion of the tooth roots in their sockets. This up and down movement of the roots under vigorous mastication is sufficiently stimulating to keep the blood coursing in the tissues and thus maintain the tissue tone without any lateral movement whatever. The more the teeth can be supported against horizontal stresses, the better, especially those with weakened periodontal structure.

The lack of contact support between the anterior teeth is not so important. The stresses on these teeth are nearly all labiolingual, not mesiodistal. Contact support has little to do with their resistance to stresses. It is also not so important from the standpoint of food impaction. Consequently, it is seldom necessary to cut into sound anterior teeth for purposes of establishing contact.

PARTIAL DENTURES

Certain principles in partial denture prosthesis are essential if the periodontal structures of remaining teeth are to be established in health and so maintained. Not so long ago a partial denture was considered a stop gap on the way to full dentures. Such an attitude shows ignorance of modern dentistry at the present time. A partial denture should be considered as a splinting device fully as much as a piece to restore masticatory function. It should be made of sufficiently rigid material so that it permits no buccolingual motion of the abutment teeth. The clasps should be designed with a paralleling device so that they slide on the abutment teeth with no lateral strain whatever on these teeth. There should be at least three teeth clasped so that the denture can not rock on two clasps. So far as possible the masticatory force on the denture should be transmitted as intrusive force on the clasped teeth through heavy lugs. If posterior teeth are absent, the denture should extend far enough back to rest on membranous bone, if possible with less pressure on bone where teeth have been extracted. The flanges should extend far enough to give great resistance against buccolingual motion. The denture base should not rest against the marginal gingiva of the remaining teeth. It may be true that flexible arms for clasps are necessary when the denture must rest almost entirely on the mucosa for support and depend on the clasps only for retention. Such a condition, however, is unsatisfactory from a periodontal standpoint, as the flexible arms fail to give support to the abutment teeth and the shifting movement of the denture on its base conducted through the flexible arms of the clasp tends to lateral movement of the abutment teeth. The rigid new alloys such as ticonium and vitallium open the way for partial den-

ture construction of a type which aids the health of the remaining teeth instead of ruining it as was generally the case with older types where more flexible and softer metals were used.

OPENING THE BITE

Much has been written with great enthusiasm about opening the bite in cases where occlusal wear has been extensive or teeth have been lost and vertical dimensions definitely decreased, or where the appearance would be improved by such opening. There are certainly cases where opening the bite is necessary and beneficial, but it is a procedure that should be approached with great conservatism. Opening the bite by more than two or three millimeters in front is likely to put the masticatory muscles under constant tension since this is about the limit of relaxation of these muscles. If these muscles are extended while in the rest position, a constant pressure is exerted on the occlusal surfaces of the teeth which acts as an orthodontic force to intrude the teeth until they are in equilibrium with the muscles. If the bite is opened by a tissue bearing appliance, the constant pressure causes bone resorption and settling of the denture. A considerable opening of the bite also alters the direction of stresses on all the remaining teeth and for a considerable period makes these teeth uncomfortable. The heightened clinical crowns also increase the mechanical disadvantage by reason of an increased ratio to the length of the clinical root. A marked opening requires new neuro-muscular coördination in eating, talking, and swallowing, and adds to the patient's discomfort. All of these factors make it desirable for the bite opening to be as slight as possible and yet accomplish the primary purpose of establishing and maintaining the health of the dentition.

When posterior dental support is lost a gradual readjustment takes place in the mandible by which the angle between the body and ramus becomes more obtuse and the posterior portion of the body is brought closer to the maxilla. The masticatory muscles shorten in adjustment in some way apparently as yet unknown. An attempt to open the bite to regain the former posterior vertical dimension requires a reverse growth toward a more acute angle between body and ramus and extension of the muscles of mastication, obviously a very slow development and one that brings great stress on the posterior teeth or saddle area.

The cases where bite opening is indicated from a periodontal standpoint are those in which the closing bite has caused traumatic occlusion, and perhaps protrusion of the upper anteriors, and which can not be relieved by a reshaping or grinding of outstanding interfering points. In most of these cases an opening of not more than two millimeters in the front is sufficient to relieve the anteriors of their traumatic stresses and permit these teeth to be brought back into a satisfactory alinement. Such a slight opening is not sufficient to bring tension on the masticatory muscles or to change muscular relations enough to cause annoyance for more than a few days.

Cases in which teeth are not sufficiently tilted to require fixed bridge work for support, but which do require bite opening to take strain from the anteriors, can sometimes be treated by means of a vitallium removable splint which covers the occlusal surfaces to the desired height of all the posterior teeth of the selected jaw, includes missing teeth, and clasps all teeth in need of buccolingual support. The author has used such appliances in several cases with great satisfaction to the patients and surprising freedom from insanitation and tendency to caries, which was the bane of such appliances made with other materials in the past.

SUMMARY AND CONCLUSION

The fundamental reasons for the susceptibility of modern man to periodontoclasia are insufficient masticatory function to develop strong periodontal ligaments and stout supporting bone, or to maintain these tissues in sufficient tone to resist bacterial invasion. The lack of any abrasive substance in the modern diet prevents the wear of the teeth which in primitive people leads to an end to end bite, flat occlusal surfaces, shortened tooth crowns, and freedom from projecting tooth surfaces that interfere with masticatory movements. Mixture of very different racial types results in some instances in irregular dentitions which can not be made fully functional. Traumatic occlusion creates a degenerative metamorphosis in the pericementum that opens the way to deep penetrating infection and periodontoclasia in cases where bacteria have already invaded the gingiva. One of the chief causes of

periodontoclasia is traumatic occlusion resulting from loss of contact support especially where teeth have been lost and the remaining teeth are tilting into the space. Tests for traumatic occlusion, when it is suspected by its signs and symptoms, are described. The indications and methods for grinding traumatized teeth and the dangers of grinding into so-called "occlusal equilibration" are noted. Contact support is necessary in posterior teeth and fixed bridge work is the only satisfactory treatment when teeth are markedly tilted toward one another. Partial dentures made of the new chrome cobalt alloys and designed according to modern principles aid rather than injure the health of the periodontal structures of the remaining teeth. Bite opening is sometimes necessary, but should be minimal as extensive bite opening is biologically unsound.

Extensive mobility and loss of alveolar bone are not the criteria by which to judge the incurability of a tooth. If there is approximately half of the periodontal attachment remaining, if periodontal instrumentation is exact and home care adequate to massage to the deepest zone of congestion and if the tooth can be protected from lateral movement and made to carry its normal quota of intrusive stress, it may be confidently expected that the tooth will become firm and healthy and alveolar bone will rebuild around it. The alveolar process may be expected to reform as far as the attachment of connective tissue to the root can serve as a matrix. Vigorous function on the remaining periodontal ligament, without excessive movement, is a stimulus for such rebuilding of alveolar bone.

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A Dental Physician

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The object of this paper is to submit a digest of the material which it had been my intention to discuss with the members and fellows of the American Academy of Periodontology at the Annual Meeting, 1942, which was to have been held in Boston, but was indefinitely postponed upon the advice of Government Officials.

Having lived in a certain environment—social, political, professional, scientific, *et al*—should enable one to acquire definite ideas concerning that environment and the lessons learned therein.

Seventy years of my life have been spent in an atmosphere of dental practice, as boy and man, a period which corresponds with *seven-tenths* of the existence of dentistry as a profession in these United States. Therefore, it would be strange indeed if I had failed to acquire definite ideas about the growth of a profession which had barely shed its swaddling-clothes at the time when the initial impressions were fixed in my mind.

There is nothing static in life: ideas come, are tried out, the wheat winnowed from the chaff, and some portion retained (1). But as time goes on scientific research adds more grist to the mill. These processes continue through the life of any undertaking. In my experience, one of the greatest errors of the past has been the habit of discarding old and tried factors, instead of adding the new strain of wheat, as it were, to the older kind, and so consolidating the good elements. As an example, when Oral Hygiene came under consideration, the axiom about a clean tooth never decaying was very popular. But later a very strong plea for Nutrition as *the* factor in dental caries came into vogue; and so Diet to a large extent *took the place of* Cleaning, instead of being *added to* measures of Hygiene. The same criticism might be applied to the reaction of dentists to the important factor of *Occlusion* when it came under scientific observation (2). In a series of Charts, pointing out "What Can Be Done For the Oral Machine," I suggested that Occlusion should be *added to* the factors of (3) Nutrition and Hygiene.

With the factors Nutrition, Occlusion, and Hygiene we can properly develop and maintain the Oral Machine, or to express it more simply, by correct (a) Building of

Parts, (b) Arrangement of Parts, (c) Cleaning of Parts.

No motor-car, or sewing machine, can function efficiently unless the three factors are one hundred per cent in operation. Furthermore, while we must consider the mouth as a Whole and its Parts, we are confronted with the necessity of studying also the development and up-keep of the Body as a Whole with specific relation to its Part—the Oral Cavity. Because the Building, including anatomy, physiology, biology, pathology, chemistry, and bacteriology, is all part of a general scheme of things, the Oral Cavity suffers in sympathy with bodily conditions. Several bodily affections show early manifestations in the oral cavity and are of great diagnostic value to physician and dentist.

It may be well to remind the reader that a presentation of this kind represents the opinion of but one individual. But, the individual aforesaid has had an exceptional opportunity over many years to observe the inner workings of dental practice, and this essay is written in an attempt to summarize the various points which are outstanding in a life-long experience.

The sum total of experience, however, to be of any abiding value should represent the mental evolution of the narrator, especially if he or she has a definite hypothesis to explain and to advise others thereupon. In such a case the simplest way to outline one's evolutionary path is by means of an autobiographical presentation.

Incidentally it is my opinion that much more knowledge of value can be disseminated in this way than people realize. A Biography is merely some one else's account of a person, and may be inaccurate, or at any rate leave out the most salient features of a life history. So if my paper seems to be too autobiographical to suit all readers I crave forgiveness.

In any such delineation as outlined, simplicity (4) is desirable, but in dealing with such a complex problem, though the "simple is desirable," attainment thereof is difficult.

It may be mentioned here that in my scheme (dental) I discriminate between dentist, dental physician, and dental surgeon; also I place the periodontist and orthodontist in both of the two latter categories.

In tracing the process of evolution of an individual one must bear in mind that such development is only possible between the limits of an "hereditary endowment," (5) but " 'Tis in the advance of the *individual* mind that the dull crowd should ground their expectation, eventually *to follow.*" (6)

In this respect the words of a wise philosopher are noteworthy: "Every man . . . is not only a learner but a doer; he learns, with the mind given him, what has been; but with the same mind he discovers farther; he invents and devises somewhat of his own . . . without originality there is no man." (7)

In this presentation I shall try to utilize a method founded on Eastern lore. This method deals with three stages of evolution: 1. One *Does;* 2. One *Knows;* 3. One *Is.* (8)

ONE DOES

Visiting, in retrospect, the house in the best known medical street of the English city where the family practice was, in 1870, and still is located (9), I find my mental impressions as vivid as ever. To a small boy the *workroom* was probably the most attractive feature, for here was the plaster section —the plaster bin, the bench, the bowls in which the mix was made, and oh, the joy of being allowed to make a mix! Then the dentures in black and pink rubber, placed in a tumbler under the skylight to enhance the color. The four or five mechanics all busy with some stage of denture work, at a large bench, with leather lined drawers and wooden supports for the hands to rest on, while filing and sandpapering a case; the three lathes where intense polishing took place—no trace of a scratch was permitted on a finished article. The bench where zinc and lead models were made, and much sand. The bench where the head man packed cases, a process which fascinated me greatly. The other impression materials, hard guttapercha, specially treated, and prepared in round flat cakes for keeping until used, especially for impressions demanding a sharp outline, like our present colloid preparations: also "Stents" (Ash & Son) which was used generally. The satisfactory results in prosthetic work were about 95% and "trying in" was never practiced with cases. There was one feature of the workroom (general) which was always a mystery to me, "the boiler." It stood about 4-5 feet high, including the gas heater, with a notable cylinder-shaped receptacle of copper, capable of

holding about five flasks. The closing of this "boiler" with its plug was a matter of sleight of hand: it took a long time to acquire the knack. I can truthfully say that in all the years I was in and out of the workroom I never even tried to do it. The cases were well baked. In the back room was the furnace for continuous gum-work, which was more in evidence seventy years ago. Here was the cabinet for teeth—about 80,000 to 100,000 were kept here, and I used to watch with great interest the selection of teeth for each case. When gum-sets were used, and beautiful sets were made, our head man would use a special lathe, with very true wheels, and placed directly under the sky-light for a north light. There were no half measures in making joints, no V shapes, everyone was perfect. In this way the first stage of *Doing* was carried out. The foregoing is meant to express the effect on a youth's mind as the result of a special environment from his earliest age.

During boyhood and up to age eighteen years, I was in attendance at preparatory schools, and at a public school, in Rutland, England, where a study of the classics was carried on continuously. I contend that a smattering of Latin and Greek is essential to an understanding of the literature of our profession. This does not mean the ability to translate all Greek and Latin books, but it is desirable to have been able once to do a good deal of translation.

Then came several years of an intensive course and training in the Medical Schools of Liverpool University and St. Bartholomew's Hospital, London. Finally, the two years at Harvard University Dental School marked the conclusion of the 1st stage—*Doing*.

ONE KNOWS

The next stage commenced in 1893, the year of my graduation from dental school. I found myself installed as assistant in the family dental practice—a very large one, with patients from a wide area of influence.*

In any practice, however well established, there is always a period of waiting before any patients are available for the newcomer. (9) Dentistry as a successful pursuit depends largely upon the personality of the operator, and patients most decidedly have their preferences for the one practitioner who has gained their confidence, either from a feeling of complete security respecting unnecessary pain at his hands, or from regard for his skill; or perhaps from having acquired the habit from childhood of going to the same dental office. In any case it is always a delicate matter to entrust an old patient to a new hand, even if the latter happens to be a relative of the senior operator.

Looking for cavities and filling them with gold was the common procedure in patients over sixteen years of age. Younger teeth were many times filled with hard gutta-percha, and although the external surface of such fillings was not very prepossessing in appearance, the internal surfaces of the cavities of teeth so treated showed remarkably little change after ten or twelve years' duty. Incidentally, it may be mentioned also that gutta-percha was frequently used in those days for impressions of mouths in which regulating measures, especially the "Coffin plate technic," were to be used, and it took very sharp impressions, but, being elastic, it had to be handled with care. Gold crowns were made, of course, two pieces as a rule; and for anterior teeth, porcelain pivot teeth were used and were very successful in point of years of service. Later came the era of porcelain inlays and gold inlays, all of which were made on the premises—and it may be said that we knew then, or thought we did, more about inlays than we do now.

Another major part of a practice in those days was extraction, or exodontia. Nearly every day in the week was commenced by the senior operators with a chloroform case. The anaesthetist was invariably a graduate of Edinburgh University and a pupil of Simpson,, who was then the great authority on chloroform. Under such circumstances (10) there never was any contretemps, but chloroform in other hands was a very dubious proposition. Of course nitrous oxide gas was used (pure) and in our experience was a most satisfactory anaesthetic for extracting a few teeth. No case of nausea was ever known, and no precautions about eating beforehand were taken. In chloroform cases, however, such precautions were taken.

During this period, however, experience was being acquired. It takes at least ten years of practice for anyone, even the most brilliant graduate of any school, to rearrange mentally and technically, the innumerable

* Liverpool, England.

details of practice at variance into a workable individual technic. Even so, it must be remembered that nothing is static; that because a thing was done in such a manner once is no reason why it should not be done in a different and better way.

Before giving any instructions let me repeat that the underlying principle of this work is to encourage and stimulate the general practitioner, who, not the specialist, is responsible for the dental salvation of the community. General practice, as its name implies, includes all the measures incidental to the building and upkeep of the dental machine, and the latter term embraces not only teeth but also supporting tissues. To successfully carry out this duty implies that the capable operator must be entirely different in caliber from the dentist of the type who has looked upon a row of teeth in the light of "wooden pegs on which can be hung all kinds of dental jewelry." (11)

Speaking frankly, my adventures in oral hygiene, in 1912, were undertaken by me mainly with the idea of trying something new. There was no hint or suggestion present in my mind at that time that oral hygiene was a health measure. However, my previous training helped me to recognize early its necessity.

The results of my research have been described in many forms, beginning with the publication of "What Can Be Done for the Dental or Oral Machine," 1924. Charts were developed in language simple enough for a child to understand. (12)

With regard to the type of education necessary to equip a practitioner for dealing adequately with the dental problems of today, I feel that a training in the classics between six and sixteen years or longer, a much more extensive acquaintance with medicine for the dental student, and at any rate a nodding acquaintance with oral conditions for the medical student are required. A thorough revision of the emphasis on certain lines of thought hitherto stressed in the dental curriculum is essential also.

It may be noticed that the word "education" is not used herein so much as "training," for the reason that education is a lifelong process of acquiring new ideas and new settings for older notions. The idea of anyone being able to attend some course or other for a definite length of time and then, after "getting by" the exam, to emerge with an education on a platter, so to speak, is too absurd.

In examining the mouths of individuals over sixteen years of age, two principles should be present in the mind of the examiner or diagnostician, viz.: (1) parts should not be examined before the whole has been surveyed; (2) a recognition of a mixed etiology in mouth health and mouth disease.

These two principles must never be forgotten if we as a profession expect to emerge from the rut of traditional routine and restricted practices.

It is time now to contrast modern methods and ideals in dental practice with those of which I have been writing. Whereas, under the old regime there may have been every excuse for a restricted practice of health measures, because there did not seem to be any health connection with dental work, at the present time with all the facilities of hospital and laboratory research in the background, there is no valid reason why a complete and systematic examination of the oral cavity, and parts associated, cannot be made. To accomplish this is the duty of every general practitioner. However, it entails a complete change of mind with regard to the scope of dentistry; a new vision must be cultivated.

Between sixteen and twenty-five years (or later) the patient should be examined on the points of: (1) Building, or nutrition, (2) Fitting of parts, or occlusion, (3) Cleaning of parts, or hygiene of the dental mechanism.

This survey should not focus on the teeth alone but must include the supporting tissues equally with the teeth. (13)

I remember visiting some years ago the clinic of a large institution devoted to children's dentistry. On arrival I was met by the supervisor, who pointed with great delight to the chairs reserved for the dental hygienist class, all occupied by patients. The class had not at that time learned how to use their instruments properly on the manikin. This was to be their first experience on the living subject. The patients were all about sixteen years of age, of both sexes, in the secondary school, and had visited the school to have their teeth "scrubbed." A cursory examination soon convinced me that not one of those patients was a fit subject for a group of inexperienced hygienists to deal

with; that many of them required very careful handling and treatment, based on knowledge of the many factors concerned in the etiology of gingivitis. To repeat, there was not a single case suited for the type of "scrubbing" to be expected under the circumstances, through ignorance of the various types of gingivitis and their significance. (14)

For the complete and satisfactory handling of any patient over sixteen years of age it should be understood by every general practitioner that:

First, there should be a Conference with the patient on general principles.

Second, an all inclusive Diagnosis, not a superficial one, must be made in each case, if only as routine, but never omitted.

Third, an outline of Treatment must be charted.

Conference—(the object is to establish a proper background for treatment.)

(a) To instruct the patient as to the principles of a mouth condition which is part of a general systemic diathesis. In other words, to make it quite plain that mouth health is part of a general health measure, and that the practitioner is acting as a dental physician. (15)

(b) To show further that such a practice entails the gathering of data such as in medical practice would make a diagnosis possible for the physician.

(c) To explain in detail why such data as radiograms, transillumination tests, vitality tests, family history, personal history, physical examination, etc. are necessary for a real diagnosis, prognosis, and an outline of treatment.

To prepare for diagnosis, make a radiographic survey of the entire dental machine, including bite-wing films for intensive inter-proximal study. Next, take impressions of the dental machine, with check-bites, and mount them on the best articulator available.

In many cases smears should be taken for bacteriologic survey, and arrangements may be made with a physician for a complete examination. The patient should also have a dietary chart to fill out, the report covering one week at least.

Diagnosis—in detail:

(a) Radiographic survey for (1) dental caries, (2) apical condition, (3) parietal condition. (See "supporting tissues.")

(b) Transillumination tests.

(c) Vitality tests.

(d) Study models—to check up occlusion, contact points, etc.

(e) Mobility of teeth: (1) movable, (2) loose, (3) wobbly.

(f) Clinical study: (1) by vision, (2) by palpation, (3) by explorers.

(g) Supporting tissues: (1) history and nature of present complaint, (2) family history, (3) personal history, (4) medical examination of tonsils, sinuses, kidneys, heart, alimentary canal, pelvic organs. Blood (pressure, count, chemistry).

Armed with the preceding data the dental physician is in a position to present an outline of conditions to the patient with a view to formulating a scientific treatment based on real etiology, a treatment which is not empirical.

The diagnostic findings should be discussed with the patient, and the simple but forceful analogy of the dental machine with any other mechanism should be carefully explained, viz.:

1. The parts must be solidly *built*.
2. The teeth must be in *alignment* for a smooth working machine.
3. The machine must be *cleaned* exactly the same as any other machine.

It should be insisted upon that these three factors be considered in every case, or the result in treatment will be unsatisfactory because restricted. The idea of one factor in health or disease must be abolished in justice to the public. (16)

Repair is not discussed here, since it is universal practice.

A systematic diagnosis should be carried out, but if the method described seems out of place or inadvisable—as in many cases it will—there are points of attack on the problem which can be used in every case (17).

The first rule is to establish the fifty-fifty status of teeth and gums, commencing with the latter to demonstrate the "mouth complexion," for as there is a facial complexion which is a guide to health of the individual

so there is undoubtedly a colour scheme of the gingival tissues which is indicative of health or disease. (18) Mouth complexions, however, vary in colour, etc., so that to prevent mistakes the operator takes the patient's lower lip, between the first finger and thumb of each hand, and everts the lip, until a clear view of the lower jaw is possible. Then the colour of the mucous membrane of the lower lip is compared with that of the marginal and alveolar gingivae. Any change in contour or colour of the gingivae betokens some abnormal condition. Next the upper lip is everted and a similar observation made. Then a test of mobility of the mandibular incisor teeth is made by using a pair of blunt-nosed pliers engaged with the incisive edges of the teeth, and with the forefinger of the left hand supporting the teeth (cervically), an attempt is made to move any one of the four incisors.

Incidentally it may be said that many instances of deviation from mouth complexion, contour of gingivae, and mobility of teeth occur as early as eight to ten years of age, and constitute some of the early changes in the periodontium, which, if unchecked, ultimately lead to an incurable condition of pyorrhea alveolaris; and yet I will guarantee that not more than 5 per cent of the patients who visit the dental office have experienced the simple tests just described. (It took at least twenty-five years of general practice before I saw my duty in this respect.)

This survey must be made if we as a profession are to increase our opportunities of preventing destruction of the periodontium.

The free margin of a normal healthy gingiva is thin and apparently bloodless, hugging the neck of the tooth, with the interdental papilla reaching well up to the points of contact of the teeth. As mentioned, the colour varies from light pink to a deeper red, and in health it has a fine stippling, or alternate spots of lighter and darker shade. Box says that when the gingiva is dried it presents a velvety appearance, due to normal circulation in the capillary loops.

Between the marginal gingiva and the tooth is a much discussed area called the gingival crevice (sulcus); and as it is still in a transitional state actually and metaphorically I shall not say much about it.

The main portion of the gingiva (alveolar) extends down (mandibular) for about 5 or 6 mm. where the tissue changes in texture, and is called the alveolar gingiva. Frequently a crescent shaped zone of abnormally deep colour confined to a zone of the marginal gingiva, for about one-sixth of its extent, is noticed. The cause is a combination of disturbance of function and unhygienic conditions.

Sometimes the whole area of the marginal gingiva is congested, probably as a result of constitutional and local causes.

Then there are to be seen the festoons described by McCall; there is a uniform festoonlike thickening of the marginal gingiva which does not involve the free margin—a very characteristic picture. It is probably concerned with traumatic occlusion and lessened power of resistance (nutritional).

Another symptom of gingival abnormality is that known as recession of the gum. Box describes this condition:

> Taking the amelo-cemental junction as a fixed landmark, it is often noted that the marginal gingiva has an altered relationship with this line. In the average—the amelo-cemental line is 2 mm. below the free margin of the gingiva. Recession of the marginal gingiva toward this line is indicative of alveolar crest absorption.
>
> . . . exposure of the amelo-cemental line represents a crest absorption of 2 mm.

This absorption is one of the early symptoms most disregarded.

In practice we see congested marginal gingivae of varied shades of colour from pale to dark red, or "lean-ham" shade, as a result of a lack of hygiene, lack of the right kind of diet, also from irritation of overhanging fillings and crowns and of faulty dentures. In both children and adults, calcareous deposits are rife and cause much trouble. In Hartzell's works, the results of such deposits, bacteria laden, are described: "Pyorrhea can exist only as a result of the activity of streptococci and staphylococci which gain access to the tissues by digesting the epithelium lining the gingival crevice" (sulcus).

In looking for deviations from the normal "mouth complexion" we are confronted with a wide range of pathologic conditions. Some of the most common at this age are Vincent's infection, acute, subacute, and chronic; gingivitis from want of cleaning; scorbutic gingivitis, gingivitis from pregnancy and from defective nutrition; purpura, syphilitic eruptions, as mucous patches; tuberculous ulceration; herpetic ulceration; aphthous ulceration; anemia; leuk-

emia; fusospirochetal disease; new growths, as epulis, generally benign, but occasionally malignant in character, usually sarcoma, but carcinoma is met with even at this age. (19)

Dr. James Ewing of the Educational Bureau of the American Dental Association has made the following important statement:

> Cancer of the mouth and tongue is a common and very often fatal disease. In the year 1922 there were 3,249 deaths from this cause in the United States, nearly all of which could have been prevented if the victims had possessed a moderate amount of easily obtained knowledge as to the causes and early signs of this disease. Cancers occur on the lip, the tongue, cheeks, gums, floor of the mouth, and tonsils, and in each situation they differ somewhat in origin and appearance. While these and other forms of cancer usually occur in persons over forty years of age, it is a highly important fact that cancer occurs not infrequently in persons between the ages of twenty and thirty years. . . . Since buccal uncleanliness is the main exciting cause of cancer of the mouth . . . it is of the utmost importance that everyone should know how to keep the mouth clean.

We come next to the very important symptom of mobility, a condition which should be looked for from eight to ten years onward through life. Box says:

> Mobility No. 1, or Movable.
>
> A degree of mobility so slight as to escape casual observance. Requires careful manipulation and, in many cases, some considerable digital pressure for its detection. In this disease, some portion of pericemental fibers are replaced by soft yielding tissue.
>
> Mobility No. 2, or Loose.
>
> When the inner plate in tooth-socket, so-called *lamina dura*, is destroyed to any extent, increased mobility, beyond that designated as No. 1, or Movable, is noticed. The teeth become loose.

In considering the various conditions of the periodontium or the supporting tissues of the teeth, remember that such conditions whether of health or of disease depend upon the fundamental principles of general physiology and general pathology.

Next in order comes a study of the models of the dental machine to demonstrate occlusion and possibilities of function. The alignment of parts of the American dental machine is estimated to be abnormal or out of gear approximately 90 per cent.

This is a serious situation and in the view of a well-known anthropologist (Hooton) constitutes a menace in the satisfactory evolution of *Homo sapiens*. (20)

> That there is a definite plan in nature to develop to perfection, there can be no doubt. Every natural process has a definite plan that is beautiful if not interfered with. . . . In fact this great natural law of balance is universal. . . . In all nature we find that if there is a lack of conformity to the ideal the thing loses beauty and becomes ugly. The ideal or beautiful is attained by function developing well-balanced geometric proportions. If function is interfered with, it must follow that development to the ideal will be interfered with, and there will be a consequent loss of balance and beauty. . . . It is exceedingly odd that while we all recognize the masticating apparatus in its normal state as such a beautiful and well-balanced machine that we should not consider it as a whole when operating upon it, and cease to do piecemeal work. (21)

If, however, the general practitioner will take the steps outlined which are necessary to check up on the conditions of each dental machine from an early age, steps may be formulated which can to a large extent overcome this national deformity. In other words, measures could be adopted which would do the maximum good for the majority of our citizens. Under existing policies, only a fraction of the 25 per cent of the citizens of the United States who have any knowledge of, or benefit from dental health measures, can afford the treatment which the ultra conservative orthodontist of the present day persists in advocating. The solution of the problem is in the hands of the general practitioner.

There is, however, another factor which has been very much misunderstood, and treatment taken altogether too much for granted in the past. I refer to the upkeep of the dental machine, and more especially to the cleaning or hygienic measures.

In the first place, I wish to emphasize the fact, in the strongest manner possible, that in the large majority of cases the technic of tooth cleansing, tongue cleansing, and gum massage is woefully *defective*. Brushing of teeth is one of the daily duties which is taken for granted, and yet in my experience people on being invited to demonstrate their usual method of toothbrushing disclose a lamentable ignorance of the principles involved. This lack of knowledge includes: (1) the kind of brush to use, as to size, arrangement and texture of the bristles; (2) the method of using the brush; (3) the times when the duty should be carried out usefully; (4) tongue cleansing; and (5) the why's and how's of gum massage. All are more or less foggy in conception and execution.

Every dentist should make a point of educating each patient about these details; and

yet I could count on the fingers of one hand all those patients who have demonstrated to me, when invited to do so, a convincing method of attack resulting from previous teaching by other practitioners. I may have been unfortunate in my selection of cases for inquiry, but that has been my experience.

It is difficult for me to grasp the reasons for this indifference, or disbelief, or ignorance on the part of so many people. It may be due to the well-known inability of the mass to see more than one thing at a time. For a considerable period in the early part of this century, the slogan "A clean tooth never decays" had a vogue and undoubtedly did a lot of good. Then the proponents of the new nutrition came along with a very convincing program, with the result that the old friend "cleaning" had to take a back seat. It was all nutrition; whereas all that was needed for success was an amalgamation of diet and cleaning. A clean, well fed tooth has a better chance. I am speaking, of course, for American citizens, and not discussing Italians, Maories, Eskimos, or Swiss dwellers in isolated valleys at the foot of the Alps.

This is not the place to go into details as to the kinds of brushes to use, or the methods of using them—Drs. Charters, and Stillman, and others have written extensively, and taught in person all over the country.

With regard to gum massage, however, I am convinced that this operation is carried out in an altogether too perfunctory manner for the reason that the blood conditions of the patient in general, and of the periodontium in particular are not studied sufficiently.

In most cases, gum massage, equilibrating muscular function, and vigorous chewing are helpful.

"Gum massage must be done in the direction in which venous blood is returned to the heart so that the arterial supply which comes from beneath may freely bring resistant and rebuilding properties to diseased tissue." (Sarrazin.)

An unhygienic condition of the mouth is probably a source of infection for the tonsils by "contiguity and moisture globules," and an oral clean-up is doubtless of much benefit in many cases of tonsillitis.

Study brushes, and other cleaners* if preferred, methods of using them, and also massage methods. The mouth must be kept clean.

The following is a summary of the methods of value in this survey:

Essential steps in diagnosis, prognosis, and treatment of odontial and periodontial conditions.

1. Chart the teeth [movable—loose—wabbly] (traumatic occlusion) fillings and crowns.
2. Radiograph the teeth [movable—loose—wabbly] and those with large fillings and crowns or cavities.
3. Study the radiographs with the chart.
4. Study the models.
5. Heavy scaling and home co-operation.
6. Systemic study—to influence diagnosis.
7. Clinical study at chair with radiographs and vitality tests.
8. Extractions of diseased teeth.
9. Chair odontexesis* and massage.
10. Correct traumatic occlusion.
11. Remove faulty crowns and fillings.
12. Probe pus pockets.
13. Arrange for scientific prosthesis, or orthodontia if necessary.
14. Curette roots and give treatment.
15. Repeat chair odontexesis and give instruction for home care; also give hints as to diet.

It is easy to voice displeasure with existing conditions, and difficult to present a remedy in an acceptable way. But in common with all branches of human endeavor in the present crisis, we as dentists will be compelled to readjust our point of view, or method of attack, of the dental problem.

By dint of *doing* "what thy hand findeth to do" with all one's might a worker in any field of endeavor gradually acquires the habit of thinking over what has been done and begins to know what it all means. By faithful Doing and appreciative Knowing there is a chance of arriving at the 3rd stage —*ONE IS*. This is the spiritual aspect of evolution.

ONE IS

In treating of this phase of development of a dental physician, it is at once evident that we are pursuing a more than difficult course, where obstacles to accomplishment are akin to those which so poignantly beset

*Holder for cotton rolls with an "Interdental stimulator."

* Odontexesis means polishing teeth by scraping, filing, planing.

the path of John Bunyan's classical hero. But it seems to me that a reasonable corollary to any active and thoughtful life is a realization of a something far more important than material success—or failure.

Rabbi Ben Ezra asks: "Shall life succeed in that it seems to fail; what I aspired to be and was not comforts me." (22) All success in life is relative, and it may be, though it sounds like a paradox, that a so-called failure is in reality a success.

In line with the foregoing statement one must realize that any one of us may stumble by accident upon a real truth, a something not realized previously, in connection with the life work. According to one philosopher when one discovers a central truth, one finds something which governs numberless facts. A mere fact is limited in scope, is *finite;* but a truth opens up a horizon, is *infinite.* (23)

Again,—Truth is within ourselves. "There is an inmost centre in *us all* where Truth abides in fulness." (24) I would that all my readers were acquainted with the outstanding pioneer work in medicine, chemistry, metallurgy, philosophy and theology of Paracelsus (1493-1541). Translations from the German of (25) "Occult Causes of Disease" would demonstrate forcibly what was to Paracelsus the real duty of a physician. In his philosophy there was no place for the pure empiricist, whose sole idea of duty was to treat symptoms. Paracelsus looked for the inner truth. In this respect an English philosopher (a little later) wrote: "It is wrong to trust the natural body to empirics . . . who know neither the cause of the disease, nor the constitution of patients, nor *true* methods of cure."*

I make no apology for introducing this angle of thought because there is no doubt that in the hurly burly of existence most of us have felt ourselves compelled to deal with what we call facts—including the necessity for making a living. It is my contention that, by entirely altering our point of view in our approach to the dental health problem, we would improve the public health.

But all of the various steps outlined for dealing with the oral cavity as a whole, and as a part of the human body, must be faithfully accomplished. Stressing one factor, viz.: Filling teeth, with the result that we are confronted with 839,000,000 cavities in the teeth of U. S. A. is not encouraging.

To attain the status of ONE IS or third stage of development we must provide training to that end commencing with the general practitioner. For instance impress on the freshman the fact that a dental health program includes equally a study of teeth *and* supporting tissues. By so doing, universally, an enormous stride would be taken in dental health. And just think what it would mean in terms of periodontia, especially if Gottlieb and his school of thought are correct in their etiology of "Pyorrhea." Then again in my opinion the periodontist could do a vast amount of good by teaching his brother dentists and the public the blessings of upkeep of the dental machine. As the result of the paucity of such knowledge the members of the American Academy of Periodontology are faced with tremendous problems daily, attempting to restore health and function to a broken down dental machine. The answer, to reiterate, is to Build the machine; Fit the parts of the Machine; and Clean the parts—all from the earliest age possible, and previous to birth see that the prospective mother has adequate medical and dental care.

This new view of the philosophy of Mouth Health entails an entirely different view-point in Education and Practice; but it may be said truly that: A person who denies the possibility of anything which is beyond the horizon of his understanding—unable to harmonize the new idea with his preconceived notions—is as credulous as he who accepts everything without discrimination.

The following are a few suggestions born of observation and experience during a half century of actual practice, which may assist one to realize the possibilities of a dental practice, and appreciate the responsibility of the dental profession for the health of the public.

1. There must be a *new vision* in dental practice—an appreciation of the scope of such practice in the field of health service.

2. The dental school curriculum may be changed to the extent that three types of practitioners may be established:

(a) Dentist.

(b) Dental physician.

(c) Dental surgeon.

* Francis Bacon

As to details the reader is referred to a previous article in *Dental Items of Interest.* (27) It may be pointed out that (b) and (c) must have much more knowledge of medicine.

3. In dealing with oral lesions a much more medical point of view must be used. Many such lesions represent the first indices of general systemic diseases and should be of assistance to physicians in diagnosis.

4. All Dental Physicians and Dental Surgeons should give a real diagnosis, prognosis, and outline of treatment to restore health and function to the dental machine in each and every case.

5. Far more knowledge of biology, biochemistry, and physico-chemistry, is required and the composition of blood and saliva more carefully considered.

6. There must be *equal* consideration of teeth *and* supporting tissues in training of students, and in practice by operators.

7. There must be an *early* recognition of pits and fissures in teeth, and of gingival conditions, mouth complexion, etc.

8. Early alveolar defects, as shown in abnormal mobility of teeth, by means of palpation, and X-rays. Tapping teeth with a metal instrument elicits a musical note in well supported teeth.

9. Much more reliable teaching of the public must be undertaken on the subjects of nutrition, occlusion, and cleaning.

10. All branches of the Healing Art must coöperate in the carrying out of a definite dental health program in the school. (28)

11. Similar coöperation on the part of the School Boards as regards the dental health program, is a *sine qua non!*

These are the minimum provisions necessary to elevate the dental profession to its true position in the ranks of those who profess the Art of Healing. As to whether such practice belongs to the profession of Medicine, or should be considered as an entity in itself remains to be settled. *There should be little doubt.* As corroborative argument favouring a new vision in dental practice the following is quoted:

> If dentistry is to survive as a health service, there must of necessity be a change of emphasis, a revision of principles and objections all along the line . . . The dental profession has been for too long a time a neglected and orphaned child of Medicine.

(Hooton: *J.A.D.A.* Nov., 1942. Prof. of Anthropology, Harvard.)

Before closing this article I want to express a fervent hope that my confréres will accept the foregoing statements in the same spirit with which they are advanced—the spirit of truth and justice.

I would also place on record the fact that my affiliation with the fellows and members of the Academy of Periodontology has been one of the brightest spots in my life—and I only wish that circumstances in late years had permitted me more frequent association with them. And I also take the opportunity to say that I feel the foundation of the Academy twenty-seven years ago was one of the most important stepping stones toward a better and brighter prospect for dental practice. We should go still farther, and then I will be justified in my endeavours.

". . . I shall be glad
If all my labours, failing of aught else
Suffice to make such inroad and procure
A wider range of thought."

REFERENCES

(1) Ezra, Ibn: *Commentaries On Old Testament,* pp. 1092-1167.
(2) Stillman, Paul R. and McCall, J. Oppie: *Clinical Periodontia.*
(3) Quinby, E. Melville: "What Can Be Done For the Dental Machine?" *Milford News,* 1924.
(4) Pascal: "Thoughts."
(5) Hooton, E. A.: *Scientific Monthly,* 1934.
(6) Browning, Robert: "Paracelsus" (Poem).
(7) Carlyle, Thomas: "Heroes and Hero Worship."
(8) Browning, Robert: "Death in the Desert."
(9) Quinby, E. Melville: "Your Patient." *Int. J. Orthodont.,* May, 1935.
(10) *Idem.*
(11) Anon.
(12) Quinby, E. Melville: "A General Plan for Dental Health Service." *Int. J. Orthodont.,* Jan., 1935.
(13) *Idem:* "Fifty Fifty." *D. Survey,* Sept., 1932.
(14) *Idem:* Experiences in Forsyth Dental Infirmary in "Your Patient." *Int. J. Orthodont.,* May, 1935.
(15) Leonard, H. J. and Morton, H. G.: Notes for Clinic in Boston.

(16) Quinby, E. Melville: "Your Patient." *Int. J. Orthodont.*, May, 1935.
(17) *Idem.*
(18) *Idem.*
(19) *Idem.*
(20) Hooton, E. A.: *Scientific Monthly*, Jan., 1934.
(21) Smith, Tom: "Malocclusion as a Factor in Deformity." *J.A.D.A.*, pp. 672-681. Aug., 1922.
(22) Browning, Robert: "Rabbi Ben Ezra."
(23) Tagore, R.: "Sadhana."
(24) Browning, Robert: "Paracelsus." (Also expressive of the creed of the real Paracelsus.)
(25) Wolfram, E.: *Occult Causes of Disease.* In Widener Library. Harvard Univ.
(26) Hartmann, F.: *Life of Paracelsus*, (London). 1888.
(27) Quinby, E. Melville: "New Birth of Dentistry." *D. Items of Interest.*, Dec., 1941.
(28) *Idem:* Comments on Dr. Schneider's Plan. *D. Items of Interest.*, June, 1942.
(29) Hooton, E. A.: *J.A.D.A.*, Nov., 1942.
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An Investigation Concerning the Dentitions of the Eskimos of Canada's Eastern Arctic*

By CHAS. H. M. WILLIAMS, D.D.S., BSc. (Dent.), *Toronto, Canada*

THE DATA collected during a dental survey and investigation amongst the Eskimos of Canada's Eastern Arctic, in the summer of 1939, has produced the following general opinions which are herewith submitted as a condensed report.

The scientific findings are summarized as follows:

1. The development of the dental arches and the arrangement of the teeth amongst the Eskimos is still much more nearly normal than amongst modernized humans but many of the dental arches of the Eskimos exhibit an irregularity of arrangement of the incisor teeth which is common to the first stage of degeneration of the dental mechanism.

2. Immunity to dental caries still persists in the mouths of all the Eskimos examined except for those who live at the posts as employees, those who are on government-supplied relief diet, or the more successful hunters who earn enough to have a larger than average proportion of the white man's food.

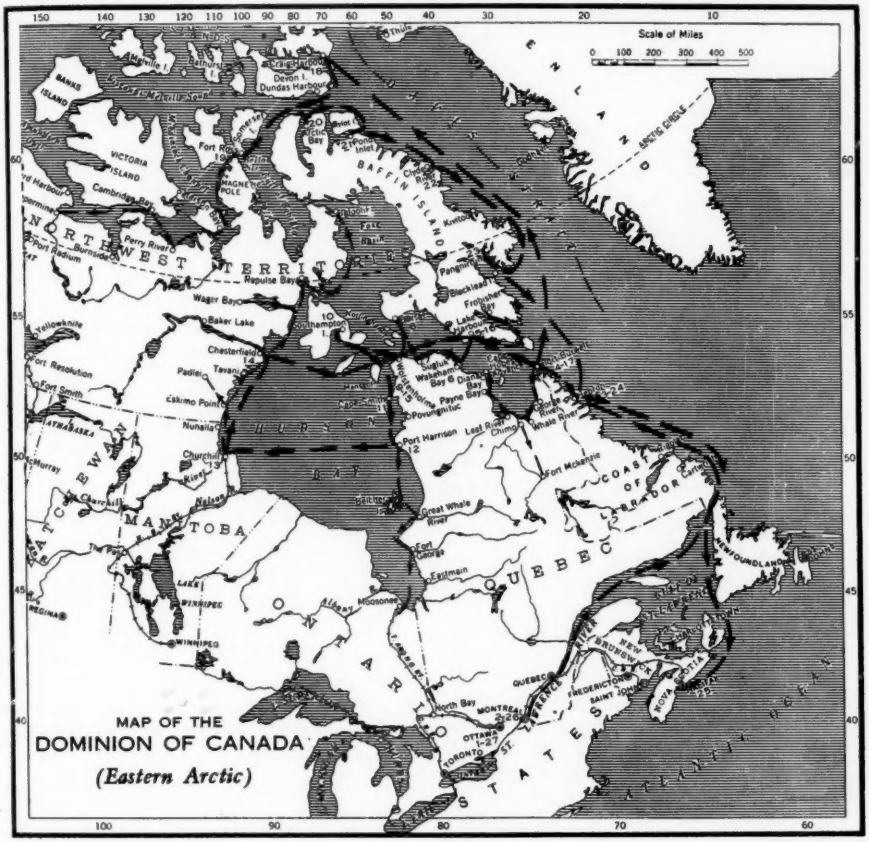
3. Susceptibility to periodontitis is almost universal and most of the older people have lost some or most of their teeth as a result of this disease. The periodontal disease is a somewhat atypical periodontitis simplex which is usually established in mild form early in life, often before the age of twenty. It progresses slowly and without the usual symptoms of marked inflammatory reaction of the gingivae. By the age of forty the periodontal disease is usually present to medium degree and is easily recognized. By the age of sixty it is common for some or most of the teeth to have been picked out. A study of skulls of Eskimos of the era preceding contact with the white man's food shows the same effects of periodontal disease.

4. Previous reports have suggested that excessive wear of the teeth is a prominent cause of dental disease among the Eskimos. Of the 278 mouths examined during the present investigation only four non-vital teeth with excessive wear as the apparent cause of death of pulps were observed. Wear of the teeth is a striking feature of the evolution of the Eskimos' dentition between youth and old age, but wear is rarely a direct cause of pathologic conditions. In the main, wear of the teeth is a normal physiologic process which is markedly insufficient among modernized humans and possibly somewhat excessive among the Eskimos.

5. The potency of the salivary enzyme amylase was observed to be usually high amongst the Eskimos. This finding parallels that of Box on other caries immune groups in Toronto.

6. Pigmentation of the alveolar mucosa is frequent and often marked. This condition is rare amongst the white races and increasingly more common amongst the

* Prepared for The American Academy of Periodontology, 1942.



darker races. The findings in this connection may be of interest to the anthropologist studying the origin of the race.

7. The form of the teeth is exceptional and may also be of interest to the anthropologist. A study of a relatively small number of teeth showed the roots to be surprisingly short and sharply tapered. A few teeth were extracted during the course of the investigation and these are being kept for further study. Arrangements have also been made to have all teeth which need to be extracted at the hospitals at Chesterfield Inlet and Pangnirtung placed in formaldehyde solution and sent out on later trips. Further study should be made of the teeth in the Eskimo skulls at the Royal Victoria Museum at Ottawa.

8. Many of the middle-aged or elderly natives have badly infected mouths which cause them discomfort and possibly ill-health. A well organized plan would allow a dentist accompanying the Nascopie each year to alleviate suffering from dental causes among the natives and also to continue the study instituted this year.

9. An excellent opportunity exists for the study of the causes and control of dental diseases amongst this splendid race. The degeneration of the dentitions of the Eskimos of the Eastern Arctic has already begun but the change in dietary habits which appears to be the cause for this degeneration has not been long established and should be relatively easy to correct. The representatives of the Hudson's Bay Company whom

I met have shown a real interest in any plan to improve the health of the natives and it seems logical that the company policy in general would favor a plan with this aim. The isolation of the various posts would allow a controlled observation of a dietary study to be conducted on a group of humans of all ages. Such an opportunity is unique. There are undoubtedly nutritional experts in Canada who would enjoy coöperating in such a plan as has been mentioned.

10. It was my pleasure to perform palliative dental treatment for the white people employed in some of the posts. This service should greatly decrease the pain and inconvenience they would have suffered until they came back to civilization. The white people stationed in the Eastern Arctic for terms of two to five years would greatly appreciate the annual visit of a dentist who could at least render such emergency service. *The above suggested service has now been established.*

The excellent development and almost complete health of the oral structures of the primitive Canadian Eskimos is nearly a traditional ideal with the dental profession. However, we expected that the few refined foods that have been available to the natives of the Eastern Arctic since the introduction of fur-trading would have induced early degeneration. The research department of the Faculty of Dentistry, University of Toronto, was therefore pleased to accept an invitation from the Department of Mines and Resources of the Canadian government, to have a member of the staff accompany the Eastern Arctic Patrol of 1939.* Our Faculty was honored in that the National Research Council, which acted in an advisory capacity to the Department of Mines and Resources, directed the invitation to us.

Dr. L. M. Waugh had previously visited Hebron and Port Burwell in Northern Labrador but it was my privilege to be the first dentist to study the dentitions of the rest of the Eastern Arctic. For most of the posts the only contact with the outside world is the annual call of the Hudson's Bay Company supply ship. There has not been any other boat or plane service. The marked isolation of this group of natives made the study particularly interesting. The war has prevented a continuance of the study.

Our research group was particularly interested in observing the degree of degeneration of the dentitions in the various posts as it relates to the fairly simple variations in the kinds and amounts of refined or "white man's foods" consumed. A correlation of such findings should indicate the relative importance of the harmful agents or practices and should allow sound suggestions for the control of dental disease. Information gained in this study might be of great value to the "civilized" races. Our Faculty was also interested in extending a study instituted by H. K. Box on the influence of the salivary enzyme amylase to include the almost caries-immune Eskimo group.

The procedure for this study was based on the division of the effort into two phases.

(a) General dental survey of a cross-section of the population available at each post at the time of the ship's arrival. All easily observable conditions were noted on charts.

(b) A more intensive study of a smaller number at each post. The following materials were obtained for later examination:

1. Samples of saliva.
2. Smears for microscopic study.
3. Impressions of teeth and jaws.
4. Still photographs and color movies.
5. Descriptions of the foods, cooking and eating habits.
6. Samples of some foods.

The exceptional amount of ice and fog that impeded the maintenance of the schedule for the trip allowed a stop of only a few hours of working time in some posts and the number of persons examined was disappointingly small. However, they seem to be representative groups, and the element of error resulting from using this number as a basis for computation will likely not be unduly large.

*The course of the trip is indicated on the map—See page 35.

The table below shows the number of natives examined at each post.

	Males	Females
Hebron	21	4
Port Burwell	4	7
Lake Harbour (2 visits)	38	10
Wakeham Bay	8	9
Sugluk	10	5
Dorset	3	13
Wolstenholme	9	3
Southampton	14	3
Cape Smith	10	
Port Harrison	2	
Chesterfield	23	12
Fort Ross	13	8
Arctic Bay	6	7
Bond Inlet	6	10
Pangnirtung	9	12
	176	103

No natives were examined at Churchill because of the very small portion of the population which they constitute and the inaccessibility of their camp. The four natives at Craig Harbour are of Greenland origin and have spent much of their lives as post employees. It seemed that the findings on these four people would be irrelevant to the study and are not included.

Medical Arts Building.

The Use of Paraformaldehyde and Oxygen in Periodontal Treatment*

By BALINT ORBAN, M. D., D. D. S., *Chicago, Illinois*

I. THE USE OF PARAFORMALDEHYDE

AS A RESULT of clinical and histopathologic experiments during the past three years, a new method has been developed for eliminating the gingival pocket. This method is a chemical tissue coagulation and has been termed gingivectomy by chemosurgery. The drug used as the chemical coagulant is paraformaldehyde (trioxymethylene). This drug, a white powder, is added to a zinc oxide base in a concentration of about 5 per cent. The formula is:

Zinc oxide	70.0 gm.
Zinc acetate	1.0 gm.
Zinc stearate	1.0 gm.
Rosin	28.0 gm.
Paraformaldehyde	5.0 gm.

The liquid consists of:

Eugenol	85.0 cc.
Cottonseed oil	15.0 cc.†

With different batches of zinc oxide and rosin the setting time of the pack may vary; therefore, it should be tested whenever new materials are mixed. Increasing or decreasing the amount of zinc acetate will regulate the setting time. This medicated cement pack (M.C.P.) produces a necrosis of the gingivae where it comes in contact with the tissues. The zinc oxide powder is mixed with the eugenol to a creamy mix. A few cotton fibers are then incorporated into the mixture and the pack is carried to the gingival margin. To prevent the pack sticking to the instruments a few dry cotton fibers are placed on the surface of the pack, and with the aid of a spatula the pack is then carried into the gingival pocket, covering also the free margin of the gingivae. Dipping the spatula into alcohol is also helpful to prevent sticking. The action of the pack is self-limiting. It will not produce more necrosis than 1½ mm.

Figures 1A to 1F show six gingival biopsy specimens from one patient. Fig. 1A was obtained before treatment and shows the extremely infiltrated, chronically inflamed gingival tissues. The epithelium is irregular, broken, and lacks hornification on its surface. The action of the paraformaldehyde pack, two days after application, is seen in Fig. 1B. A portion of the gingiva has become necrotic and has become demarcated from the rest of the tissue by an accumulation of leukocytes. Four days after application of the pack the necrotic tissue started to separate from its base as seen in Fig. 1C. After eight days the necrotic surface layers were cast off. Fig. 1D shows the clean wound surface eight days after the application of M.C.P. On the tenth day after application

* From the Foundation for Dental Research of the Chicago College of Dental Surgery.

† This formula, without the paraformaldehyde, is based on the recommendation of the Council on Dental Therapeutics of the A.D.A.—for Zinc Oxide and Eugenol Cements. *J.A.D.A.* 26: 1536. 1939.

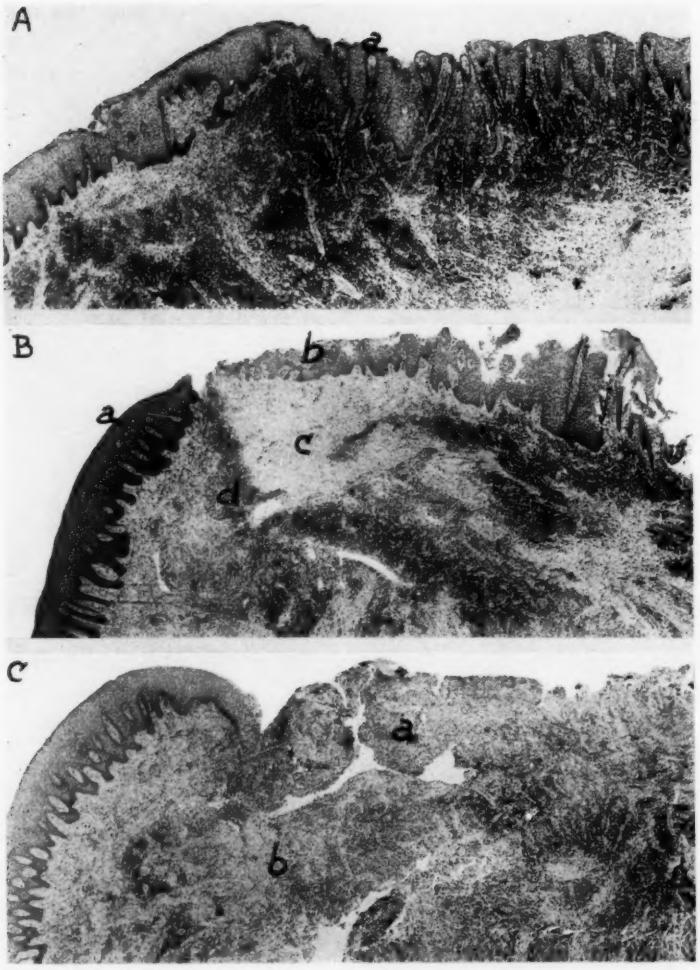


Fig. 1. Action of paraformaldehyde pack (MCP) upon the gingiva. A—Extremely infiltrated, chronically inflamed gingiva. Epithelium (a) broken in several places; irregular. Connective tissue (b) filled with plasma cells. B—Action of the pack after two days: (a) normal epithelium, (b) necrotic epithelium, (c) necrotic connective tissue, (necrosis is due to the action of paraformaldehyde), (d) leukocytic demarcation of the necrotic from living tissue. C—After four days' action of MCP the necrotic tissue (a) is separated from the living tissue (b).

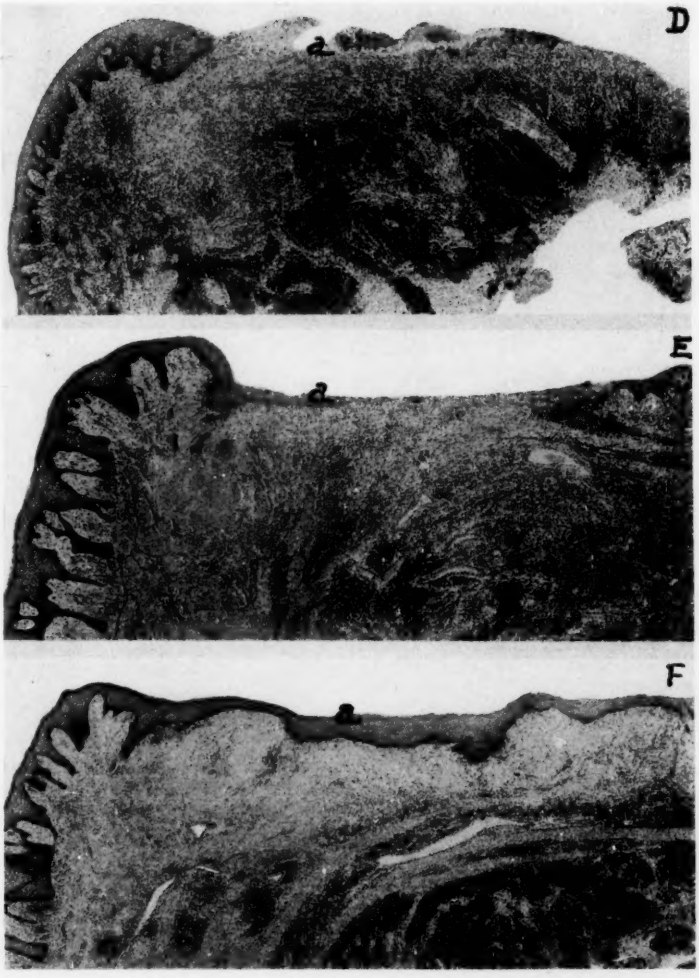


Fig. 1 (Continued). D—Eight days after application of MCP the necrotic tissue is cast off and the wound surface lies free (a). E—Ten days after placing the MCP new epithelium (a) migrates over the clean wound surface. F—In fourteen days the wound surface is entirely covered by new epithelium (a).

of the pack the surface epithelium begins to migrate over the exposed wound surface (Fig. 1E) and, after fourteen days, the entire wound surface is covered with new epithelium as seen in Fig. 1F. Fig. 2A shows a case before treatment, and Fig. 2B after completed treatment. Paraformaldehyde pack was used only once in this case to eliminate the excessive gingival tissues.

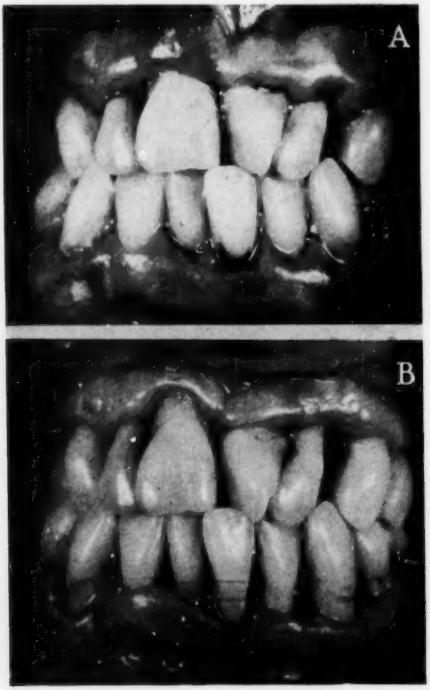


Fig. 2. Case before (A) and after (B) application of MCP. The excessive gingival tissue has been eliminated to the bottom of the gingival pocket.

Paraformaldehyde is a dentin desensitizing agent. J. P. Buckley made a considerable number of investigations concerning the action of this drug on dentin. In high concentration pulp necrosis occurs, but in low concentration the pulp is not injured. A concentration of about 5 per cent, as recommended for eliminating gingival tissues, will not produce any pulp injuries, but is a great aid in preventing sensitivity of exposed root surfaces which is of considerable annoyance when other methods of gingivectomy are used.

No undesirable tissue reaction develops if the instructions are followed. Sensitivity to formaldehyde may occasionally be encountered, but this fact cannot be known until the pack is used. If allergy is encountered it will manifest itself in an inflammatory reaction in the gingiva, cheeks, lips, and tongue. In this case the pack must be removed at once and the oral cavity rinsed after which the symptoms will disappear.

Two undesirable effects have been observed at times. First, necrosis of bone occurs if the pack is placed in deep pockets reaching below the alveolar bone margin. Packing of such pockets should be avoided. The other undesirable effect is observed when the pack is inserted so tightly around a tooth that seepage of exudate from the pocket is prevented. Due to an accumulation of the exudate an acute abscess may develop causing considerable discomfort. If the pack is removed and the abscess opened, the pain subsides immediately and healing follows without leaving any permanent injury. There is no reason for alarm if an abscess develops; however, it can be avoided by observing certain precautions.

The advantage of using the M.C.P. for removing excessive gingival tissue lies mainly in its easy application and because its action is painless. It can be applied without the use of an anesthetic and one does not have to overcome the objections of some patients to an "operation." It can be used in single pockets or in larger areas. It is advisable to limit one application to an area of not more than six teeth. The pack can be applied on the buccal and proximal pockets at the same time leaving the lingual pocket without the pack. This permits seepage of exudate and prevents undesirable reaction. Frequently the lingual pocket recedes without further treatment after elimination of the buccal and proximal pockets. The surface of the hardened M.C.P. should be painted with cavity varnish to prevent the paraformaldehyde from cauterizing the mucous membrane of the lips, cheeks or tongue. The action of paraformaldehyde is exhausted in two days so that the pack can be removed two days after application. However, if the patient is prevented from returning to the periodontist in two days it will do no harm. If the pack is removed two days after application, the necrotized gingiva will remain

in place, showing as a gray margin. It will be cast off in four to eight days, without any bleeding. If, however, the M.C.P. is not removed until four to eight days after application, the necrotized part of the gingiva will be removed with the pack. It remains attached to the hard undersurface of the pack. If one application of M.C.P. is not sufficient to remove all tissue to the desired extent, one or more applications can be made after the necrotic tissue is cast off. After the M.C.P. is removed a neutral pack should be placed to protect the wound. This pack can be the same composition as the formula given for the M.C.P. pack, but without the paraformaldehyde. Paraffin can also be used to good advantage for packing the wound surface. Paraffin is easily applied and easily removed. The neutral pack should be changed every two to three days to facilitate cleansing the wound surface and treatment of the developing granulation tissue.* After the necrotic tissue is cast off, the granulating wound surface should be treated with an astringent or coagulating drug, such as silver nitrate, zinc chloride, or trichloracetic acid; whereas the chronic inflammation of the deeper gingival tissues should be treated by the application of oxygen in the form of Superoxol.

II. THE USE OF OXYGEN

As a result of the past three years' experimental work and practical application a new method of oxygen application has been introduced. It has been found that oxygen is a very useful aid in the treatment of chronic inflammatory tissues. Oxygen was applied in the form of Superoxol (Merck), a 30 per cent undiluted hydrogen peroxide. Superoxol is highly acid and has to be neutralized before use by adding one drop of 5 per cent bicarbonate of soda to ten or less drops of Superoxol. The neutralized Superoxol has slightly less oxygen (about 28-29%) but its pH is about 6. It becomes inactive 30 to 60 minutes after neutralization.

Superoxol is absorbed in a few cotton fibers which are carried into the gingival sulcus by means of a flat instrument, and kept in place for about one-half minute. The tissue catalase liberates oxygen from the peroxide. Oxygen penetrates through the epithelium into the connective tissue in innumerable bubbles. The action of Superoxol is painless, causing only a slight burning sensation, and no coagulation or sloughing of the tissue results. Its action is not caustic. The application is repeated at the same session until the tissue blanches; blanching is due to compression of the capillaries and presence of the bubbles in the tissues, and not tissue coagulation. In fifteen to twenty minutes the whiteness disappears. If the application of Superoxol is repeated twice a week for a period of six to ten weeks, the chronic inflammation of the gingiva subsides. Microscopically, the plasma cells in the connective tissue show degeneration and they finally disappear. Eosinophils are more numerous than before. The tissue assumes fibrous character. The epithelium shows very marked peg formation with extremely numerous mitotic figures. Hornification on the surface is more intensive than before treatment.†

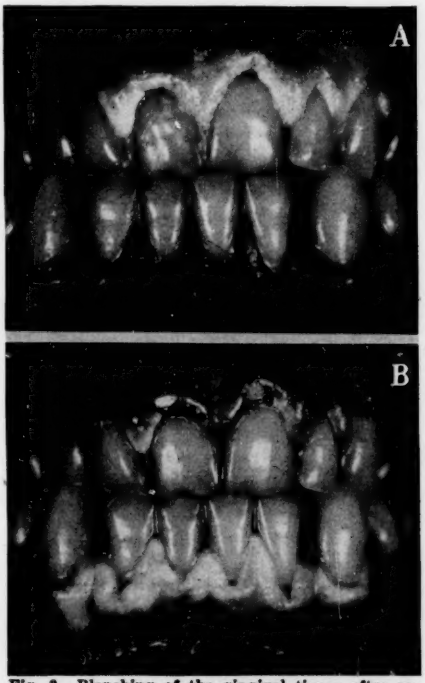


Fig. 3. Blanching of the gingival tissue after application of concentrated hydrogen peroxide (Superoxol, Merck). Blanching disappears within a few minutes.

Fig. 3 shows blanching of tissues after the application of Superoxol. This blanching disappears in a few minutes without

*See *J.A.D.A.* 29: 2018. Nov., 1942.
†*J. Periodont.*, 12:89. July, 1941.

tissue sloughing. A biopsy specimen, taken immediately after the application of the Superoxol, shows innumerable oxygen bubbles in the tissue (Fig. 4). These oxygen bubbles penetrate deeply into the inflamed connective tissue. After ten applications (twice a week for five weeks) the character of tissue changes considerably. Fig. 5A shows the gingiva before treatment and Fig. 5B after ten applications of Superoxol. The epithelium has become thicker and shows hornification on its surface. The epithelial pegs show considerable proliferation. The connective tissue is no longer densely infiltrated with plasma cells as it was before treatment (Fig. 5A). Numerous new capillaries have developed and the tissue is fibrous in character. There are only single plasma cells instead of the dense groups seen in the specimen before treatment. The entire character of this connective tissue is that of a very active tissue showing all its potentialities for regeneration.

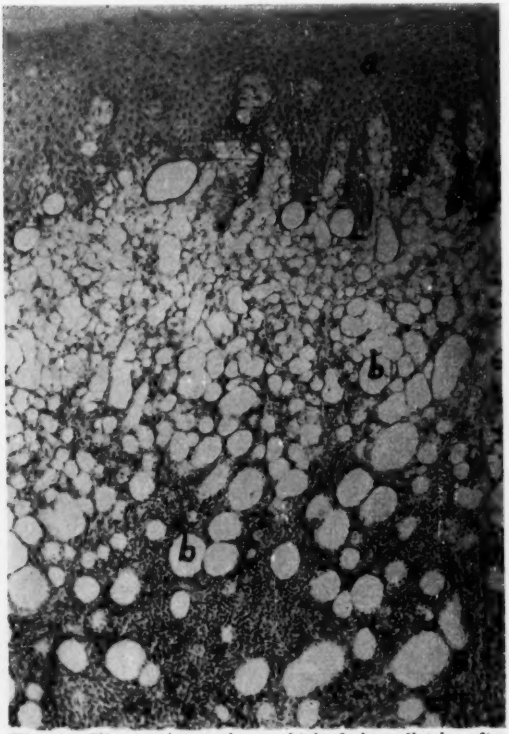


Fig. 4. Microscopic specimen obtained immediately after application of Superoxol: a—epithelium, b—oxygen bubbles in the connective tissue.

Superoxol has to be considered as a very potent therapeutic agent in the treatment of chronic gingival inflammation. It stimulates tissue regeneration and combats chronic inflammation. Tissue congestion disappears and active young connective tissue develops.

The oxygen developing from Superoxol is an active atomic oxygen. The oxygen obtained from an oxygen tank is molecular oxygen and very much less active.

SUMMARY

Observation of the following points will prove helpful in applying the pack and carrying out a chemosurgical gingivectomy with proper post-operative treatment.

1. Mix M.C.P. and eugenol on waxed paper slab with stiff spatula.

2. Spatulate to creamy mix and add a few cotton fibers.

3. Place M.C.P. containing cotton fibers on the tooth at the gingival margin and carry into the pocket with a thin spatula.

4. To prevent sticking of M.C.P. to spatula, place a few fibers of dry cotton on the surface of the pack, or dip spatula into alcohol.

5. After the M.C.P. is packed into pockets, spatulate the remainder to a thick mix and place on top of softer pack in pockets.

6. After M.C.P. has hardened, paint surface with cavity varnish.

7. Do not pack M.C.P. all around a tooth at one time, and do not pack too tightly.

8. Do not pack M.C.P. too deeply in a pocket which reaches below the bone margin, as bone necrosis might occur with sequester formation.

9. Remove M.C.P. two days after application and replace with paraffin pack or any neutral zinc oxide-eugenol pack.

10. If patient cannot return after two days M.C.P. can be left in place longer without causing harm, but two days are sufficient.

11. Packing with M.C.P. can be repeated several times if one packing has not eliminated the entire excess tissue.

12. To prevent excessive granulation, cauterize granulating wound surface with silver nitrate (concentrated), 10 per cent zinc chloride, or 20 per cent trichloracetic acid.

13. To promote tissue regeneration and combat chronic inflammation, use oxygen (30 per cent Superoxol, Merck) after necrotic gingival margin has been cast off. Neutralize acidity of Superoxol by adding one drop of 5 per cent solution of bicarbonate of soda to ten or less drops of Superoxol.

14. Repeat application of oxygen twice a week for five weeks.

15. Repeat application of silver nitrate

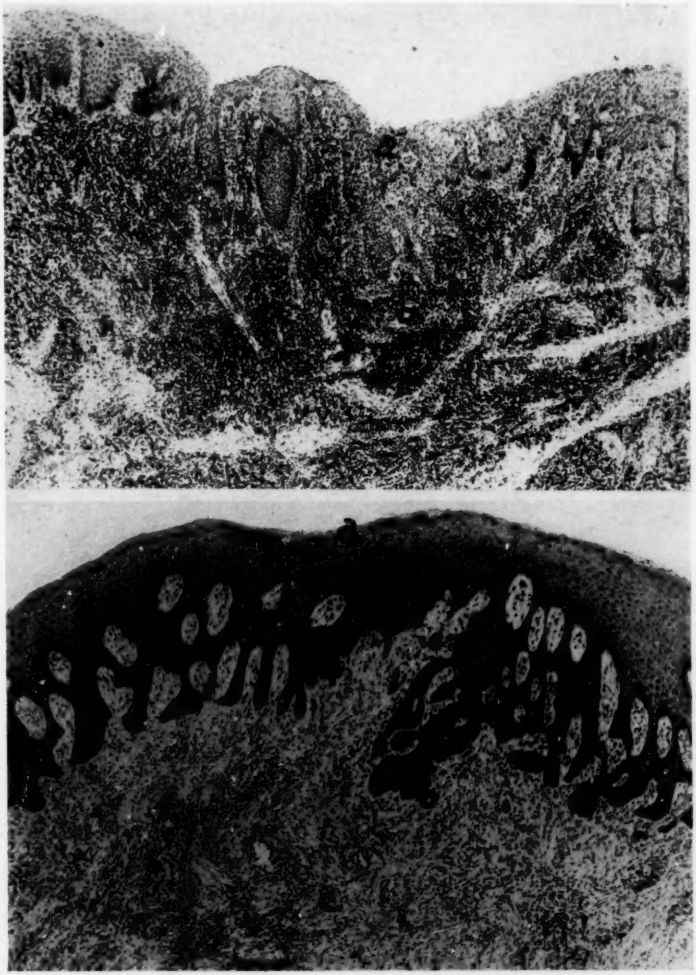


Fig. 5. Biopsy specimen before treatment (A) and after ten applications of Superoxol (B). Before treatment (A) the epithelium (a) is thin and broken and the connective tissue full of plasma cells (b). After the application of Superoxol (B) the epithelium (a) is thick and continuous, well hornified. Many finger-like processes (b) proliferate into the connective tissue. The connective tissue (c) is free from plasma cell accumulation and shows high regenerative activity.

whenever granulation tissue tends to overgrow.

16. Remove all calculus and polish surfaces of teeth.

17. Instruct patient in proper home care, use of toothbrush, interdental stimulator, pipe cleaner, etc., also insist on instructions being followed.

18. Establish balanced occlusion and remove cusp interference.

19. Check with patients every three to six months.

20. Insist on medical examination and treatment for patient if systemic condition is not satisfactory.

In closing, it should be stressed that the chemo-surgical method of eliminating excessive gingival tissue is not considered by the author to be the only, or necessarily the best method for obtaining the desired result. This method can be used to great advantage in well-selected cases. Experience and careful consideration of all factors involved will help in the selection of the specific cases. Subgingival curettage and conservative surgical gingivectomy are still favored procedures of the author.

The use of Superoxol is not limited to cases treated by chemo-surgery. It can and should be used in all cases, combined with subgingival curettage, surgical or electrical gingivectomy. If we expect the proper tissue regeneration our aim should always be the elimination of the chronically inflamed granulation tissue by transforming it into an active mesenchymal tissue, and this can be done with repeated applications of Superoxol.

180 N. Michigan Ave.

AMERICAN ACADEMY OF PERIODONTOLOGY

Postgraduate Course Given at the

W. K. KELLOGG FOUNDATION INSTITUTE

Ann Arbor, Michigan

May 18, 19 and 20, *1942*

MONDAY, MAY 18

9:00—Registration—

10:00

Endocrinology in Relation to Dentistry. Hugo R. Rony, M. D., Chief, Endocrine Clinic, Mount Sinai Hospital, Chicago.

2:00

Endocrinology (continued by Dr. Rony).

3:30

Physical Diagnosis. Arthur C. Curtis, M. D., Medical School, University of Michigan.

7:30

Open Forum conducted by Dr. Rony.

TUESDAY, MAY 19

9:00

Endocrinology—Medical Aspect: Importance in Diagnosis. Elmer L. Sevringhaus, M. D., Professor of Medicine, University of Wisconsin.

10:30

Vitamin Deficiency Diseases. Arthur C. Curtis, M.D., Medical School, University of Michigan.

2:00

Arthritis—Diagnosis and Etiology. Richard H. Freiberg, M.D., Medical School, University of Michigan.

3:30

Endocrinology—Medical Aspect (continued by Dr. Sevringhaus).

6:30

Dinner Session—Periodontology in Dental Education. Harold J. Leonard, D.D.S., Columbia University, New York.

WEDNESDAY, MAY 20

9:00

Relationship of Vitamin C to Gingivitis. Mary C. Crowley, M. S., School of Dentistry, University of Michigan.

10:00

General Oral Pathology. Kurt H. Thoma, D.M.D., Harvard Medical School.

2:00

Arthritis—Treatment. Richard H. Freiberg, M. D., Medical School, University of Michigan.

3:30

General Oral Pathology (continued by Dr. Thoma).

Editorials

The Things That Matter

THE value of many beliefs, ideas, methods, and customs, is being tested in these disturbing days. Even the worth of life itself is being challenged by various ideologies and the holocaust which has spread over the entire world. The Allied Nations are fighting for the "Four Freedoms," in other words, for the things that matter. But, unfortunately, there is a difference of opinion as to what these things are.

Among the members of our own profession there are those who believe that private practice is doomed and that the inevitable future for dentistry is service for the greatest number of people with, of necessity, limited regard for its quality. On the other hand, there are many who believe that quantity of dental services, unless intelligently controlled as to kind and quality, may prove of uncertain value to those served and disastrous to dentistry. They believe also that honesty, judgment, thoroughness, and quality are important factors in dental practice. These dentists are on the alert for fear that after the war, dentistry may be valued entirely on a quantity basis, and its methods of practice dictated by political expediency and directed by men uneducated in dentistry. We can ill afford to lose the benefits for patients of more than a century of effort to improve the quality of dental services.

Among other things that matter in dentistry is our Code of Ethics. As this deals with our relations to patients and our confreres, it is definite, easily understood, and generally considered important by dentists. But the ethics of dental journalism is not as yet so well understood, in fact it is quite vague to many of us and has not been given an adequate amount of thought. This matter deserves our best attention before it gets out of hand because of neglect. Let us no longer avoid the problem but face it frankly.

Does it really matter if the advertisements printed in our professional periodicals are false or misleading? They seldom deceive us. Is it of serious consequence that members of organized dentistry are sometimes exploited for the benefit of commercial interests? If they are not worried, why should we be? Who cares if tens of thousands of reprints of scientific articles in our journals are purchased by manufacturers to distribute to their customers in order to promote the sale of some article casually mentioned in the text of the original contribution? Just what is the objection to that? What difference does it make, when we are so short of funds for research, if some sagacious business man can see trees in an apple and decides to contribute a considerable sum for research in exchange for a few minor(?) concessions? In case the research results in data which can be

used by the donor of the funds, in advertising, who will have the courage to object when he has been so *generous*? One wonders if the exigency for research funds is so great in some institutions that they must be had at any cost, such as the price of professional dignity? There are institutions of learning who refuse to accept grants for research where questionable concessions must be made for them. Could not this become the usual attitude of schools and universities?

But to continue our interrogations—Why subscribe for a dental journal when it can be had without apparent cost? Should "something for nothing" be the policy or "anything of value is worth a price?"

All of the foregoing questions will no doubt seem absurd to many readers, but they have been asked because there are still too many of us in doubt as to how they should be answered. It is not entirely clear to us all where the line should be drawn.

These queries should be answered with a certainty that will leave no doubt in any one's mind as to what one's stand should be. There is no middle ground. Definite decisions should be reached after mature thought and based upon Disraeli's motto of "principle, not expediency."

While the war with all of its ramifications must of necessity occupy our minds and hearts, yet at the same time we who are on the home front have the privilege and responsibility of guarding well the things that matter, not the least of which is the profession to which we belong with its *ideals* of service, of ethics, and of literature.

—G. R. S.

Journal Supplements for 1943

THE American Academy of Periodontology had no Annual Meeting last year, and no scientific sessions are planned for the Annual Meeting this year. The Council, in an effort to compensate the members for this loss, has decided to provide for the publication of a Supplement to each of the regular issues of the Journal of Periodontology, in 1943.

The Supplement to the January number will be issued in April and will contain, in addition to abstracts and other material, a new feature of the Journal. This will be in the form of an organized discussion of selected controversial subjects in periodontology. Its purpose is to reduce the number of differences of opinion and to arrive at basic truths in periodontology.

ABSTRACTS AND EXTRACTS OF CURRENT DENTAL LITERATURE FOR 1942

(f) Treatment

(Continued from 13(2):115. July, 1942.)

639—Bettman, M. M.: **Prevention and early treatment in periodontal disease.** *Dent., Dig. Pract.* June, 1942.

Many practitioners still fail to recognize that periodontal disease can be successfully treated. Fortunately, dental colleges are now devoting more time to periodontia. Most cases of periodontoclasia could have been prevented if proper attention had been given to early symptoms. Skillful treatment of the disease, when present, will effect a cure in all but very advanced cases.

In oral examination, the dentist must pay as much attention to the supporting tissues of the teeth as to the teeth themselves; incipient stages of periodontal disease must be treated at once. Proper prophylaxis means use of periodontal scalers with as much care in technic as is used in proper curettage in pockets. After thorough curettage the teeth should be polished. Examine occlusion and correct any traumatic factors. Also correct open contacts which permit food impaction, and overhanging fillings.

—*Martin Blumenfeld*

640—Blackstone, C. Harlan: **A clinical and roentgenographic study of periodontic problems in children with systemic disease.** *J.A.D.A.* **29**(13):1664-73. Sept., 1942.

Periodontology has been chiefly concerned with the adult patient, however, recent trends in preventive dentistry emphasize the importance of periodontic problems in children. While in the adult mouth one is inclined to emphasize the exogenous etiologic factors of periodontal disease, in this article, dealing with periodontal problems in children and young adults, a few of the endogenous factors are presented. Diabetes mellitus, congenital syphilis, oral manifestations of scurvy, and aplastic anemia are discussed, cases described and illustrated.

Oral surgery including extractions are contra-indicated in a diabetic child not under medically controlled treatment. One-third of the diabetic children had calcareous deposits at first dental examination and 18 per cent developed calculus after routine treatment was instituted. One hundred and eighty-eight diabetic children were studied. From the study of thirty-eight congenital syphilitic patients it was noted that periodontal structures show an adverse effect to syphilitic treatment. Only fifteen had a normal gingival condition and 47 per cent had marked hyperemia of the gingival tissues. Oral manifestations in scurvy are called inconsistent. Two cases of aplastic anemia are reported. One had a typical periodontal hemorrhage while the other had no serious oral manifestation. The foregoing cases have both a dental and a medical connotation.

—*G.R.S.*

641—Blockley, C. H. and P. E. Baenziger: **An investigation into the connection between the vitamin C content of the blood and periodontal disease.** Abstr. copied from *J.A.D.A.* **29**(15):1923. Oct., 1942.

Clinical and experimental data indicate that there is a definite relation between a low vitamin C blood level and certain periodontal diseases. The best method of saturating the tissues with vitamin C is administration of large doses of the synthetic form, 200-500 mg. daily. After the desired saturation is reached, a minimum of 0.5 mg. of ascorbic acid in natural or synthetic form should be given, to maintain a normal level. In the cases reported, marked improvement occurred after two or three weeks' therapy. A level of from 0.8 to 1.0 mg. per hundred cubic centimeters of blood will insure an adequate reserve of the vitamin in the tissues. Pyorrhea may be caused by a lack of vitamin C, but, for complete repair, treatment should be begun before pocket formation.—*Brit. D. J.*, 73:57, August 1, 1942.

—*V. H. Powell*

642—Campbell, H. J.: **Treatment of gingivitis with ascorbic acid.** *D. Digest.* **48**:174. Apr., 1942.

Eighteen out of 505 new patients were found to be suffering from gingivitis; 14 were treated with massive doses of ascorbic acid with favorable results, while 4 failed to coöperate (Dundee Dent. Hosp.). Patient complains of bleeding gums and lassitude; gums congested and red; bleed freely on pressure; 2 cases showed sloughing of gums. In no case could gingivitis be attributed to

trauma, calculus, or drugs; no gross signs of prescorbutic state.

No dental treatment given at all. Patient given 300 mg. ascorbic acid, and urine sample taken 6-12 hours later; presence of 5 mg. or more of acid per 100 mg. taken as saturation. This is repeated for at least 6 days. Amount of ascorbic acid necessary to saturate patients varied from 900-4200 mg., with average of 2,000 mg. After first day, pain largely disappears, and congested area of gums shrinks to half original height. In most cases, there was no bleeding on pressure after 4 days; long-standing cases more refractory. When patients are fully saturated and gums in good condition, they are given maintenance dose of 100 mg. per day; check-up visit each week.

Results would indicate that lack of ascorbic acid is one important factor in causation of such cases of gingivitis. Disappearance of lesion and continued administration of the vitamin must be more than fortuitous. Large amounts necessary for saturation are striking.

—*M.B.*

643—Coolidge, E. D.: **Hypertrophic gingivitis.** *Dent., Dig. Prac.* **2**:482-484. Apr., 1942. (Cond. from *The Bur*, Nov., 1941).

Hypertrophy or hyperplasia of gums is common; local irritation is its most common etiologic factor. Local factors include: food remnants; calculus; overhanging margins of restorations; innumerable mouth organisms that contribute to, or are the cause of, chronic inflammation; crowded and malposed teeth that do not allow normal interproximal space; excessive overbite; mouth breathing. Several predisposing factors seem to influence the development of hypertrophy, in some cases where local factors are insignificant. Thoma lists four sub-types of hypertrophic gingivitis associated with systemic disturbances: scorbutic, pregnancy, leukemic, and diabetic. Dilantin-sodium, now used for epilepsy, produces a specific type of hyperplasia with excessive keratinization.

In treatment, where local irritants are recognized, it is first necessary to establish a high degree of oral hygiene, by curettage and proper home care. Operative and prosthetic restorations must be corrected, where necessary; Vincent's infection must be treated, if present; orthodontics, or else judicious grinding for the correction of traumatic occlusion. Early surgical treatment is contraindicated. Where systemic factors are concerned, these must be corrected.

—*M.B.*

644—Correa, A. and Oriente, L.: **Nicotinic acid in therapy of gangrenous and ulcerous stomatitis and Vincent's infection.** *Rev. Brasileira de Oto-Rino-Laringologia.* Nov.-Dec., 1941. Abstr. *J.A.M.A.* **119**(12):981. July 18, 1942.

Correa and Oriente stress the role of avitaminosis in the pathogenesis of ulcerous stomatitis and the frequent occurrence of Vincent's infection as a complication. The authors report good results from topical applications of a 20 per cent solution of sodium hypochlorite four or five times a day and of nicotinic acid by mouth in doses which varied from 100 to 400 mg. The average duration of the treatment was between twenty and thirty days. Subacute ulcerative stomatitis has a tendency to develop into a gangrenous type unless the patient has the proper hygienic care and diet. Gangrenous stomatitis frequently exhibits symptoms similar to those of noma. Nicotinic acid administered in the doses mentioned controls the stomatitis of either the gangrenous or the ulcerative type and the complicating Vincent's infection. Twenty-four cases are reported as occurring in children from 2 to 15 years of age. Good results were obtained in all.

—*Copy*

645—Ellenberg, Max and Herbert Pollack: **Pseudo ariboflavinosis.** *J.A.M.A.* **119**(10):790-792. July 4, 1942.

Authors collected a group of 34 cases which apparently conformed to the classical syndrome of ariboflavinosis, as set down by Sebrell and Butler (*Pub. Health Reports* 53:2282, 1938 and 54:2121, 1939). The cases failed to respond to riboflavin used intravenously or intramuscularly in doses well above those usually considered adequate. Local causes for the lesions were then sought and the presence of artificial dentures seemed to implicate them in the pathogenesis of the syndrome. The underlying causes seemed to be a shortened vertical dimension with extreme over-bite, and apparently the perleche and probably even the glossitis were due to these mechanical

defects. This supposition is supported by the fact that in patients who could afford better dentistry or who had better dentures the symptoms did not occur. Obviously aribo-flavinosis may be co-incidental with the above. The possibility of a mechanical cause for the syndrome described should be taken into account so that unnecessary vitamin therapy may be avoided and indicated restorative work instituted.

—*Celia Rich*

646—Fitzsimmons, L. J.: **Failure of cevitamic acid as a therapeutic agent in periodontal disease.** *J.A.D.A.* **29**:842-844. May, 1942.

The use of synthetic vitamin C, or cevitamic acid tablets has increased materially since research has proved their therapeutic efficiency and active element ingredient. Rule of "hit or miss" must be eliminated; aid of medical internist is invaluable in determining where to prescribe it. Clear picture of prophylactic dosage and therapeutic dosage must be kept in mind. Gastrointestinal disturbances will prevent absorption of cevitamic acid, and they must be corrected before prescribing it. Complete knowledge of weekly food intake is necessary; we must advise a diet that shall lean toward alkaline ash side to insure better utilization of the vitamin. Other causes for the gingival condition besides vitamin C deficiency, such as streptococcic infection, blood dyscrasias, menopause or mild endocrine disbalance—must be eliminated in diagnosis before vitamin C is prescribed.

—*M. B.*

647—Goodridge, D. L.: **A case of Vincent's ulceration in a patient undergoing anti-syphilitic treatment.** *Brit. Dent. J.* **72**:12-13. Jan. 1, 1942.

A patient, who had been under treatment for syphilis, with alternating arsenic and bismuth injections, was referred to the Dental Surgeon of the British Army. Vincent's ulceration was found in the lower left incisor and canine regions; fetid breath; teeth regular and clean; slight marginal gingivitis and bismuth line on lingual of lower incisors. The condition had existed, with alternating periods of remission and exacerbation during the whole time of anti-syphilitic therapy.

Treatment consisted of local use of chromic acid, neo-arsphenamine, and scaling; case was cured in two weeks. Author suggests that bismuth lowers resistance of gingivae to infection; thorough scaling should be done at start of anti-syphilitic therapy. He further states his doubt that intravenous arsenic is of specific value in Vincent's infection, since in this case the patient's system had been saturated with arsenic while the Vincent's infection had existed in sub-acute form for nine months, with occasional acute flare-ups.

—*M. B.*

648—Hayden, W. Y.: **Vincent's infection.** *J. Canad.* D. Assoc. **8**:178-179. Apr., 1942.

Thoroughness of medication, rather than choice of medication, is what counts in treatment of Vincent's infection. Effective procedure demands the following: removal of slough; penetration of drug to depth of every sulcus; frequent applications; drugs used should be varied at each sitting; patient should take sufficient vitamins; patient coöperation; patient must take precautions against spreading infection; after infection is cleared up, removal of every nidus to prevent recurrence. Application of drug can be made with cotton on blunted barbed broach, on pellets of cotton inserted into sulci, or with spray bottle and gums held back with burnisher. Acute cases are fairly easy to diagnose; but subacute cases are more difficult and require careful diagnosis. Low grade cases are carriers. Young dentists, especially dental officers, have the responsibility of recognizing and treating Vincent's infection which is, and will probably continue to be, on the increase.

—*M. B.*

649—Hirschfeld, I.: **Conservative treatment of pyorrhea.** *N. Y. J. Dent.* **12**: 237. June, 1942.

The author stresses the fact that pyorrhea can be successfully treated, contrary to the belief of many practitioners. Both the conservative and radical methods of treatment are but a single phase in the course of treatment as a whole, if permanent results are sought; the dentist should be open-minded in his selection of the type of periodontal treatment, according to the requirements of the individual case, or of certain teeth. But, in the author's opinion, conservative treatment is indicated in the vast majority of instances; he presents his reasons for so

concluding. The advantages claimed for surgical treatment are: open view and ease of instrumentation, saving of time, and more efficient eradication of foci of infection. He then discusses these, pointing out that the conservative treatment equals the radical method, according to these three points:

1. In the usual run of cases, conservative treatment should take precedence, and radical types be employed where the former is impossible or has proved unsuccessful.

2. The general practitioner should learn to master the conservative treatment before attempting the various radical procedures.

3. The practitioner should learn to detect and treat periodontal disease in its incipiency.

—*M. B.*

650—Kirkland, O.: **Modern technics in periodontia.** *J.A.D.A.* **29**:817-22. May, 1942.

The author feels that results in periodontia are invariably satisfactory when prognosis is favorable and correct principles of treatment are applied. Surgical treatment is only dependable approach in treatment of periodontal disease. Before this is started, mouth should be made as clean as possible by superficial scaling. The technic of gingivectomy is described. Field of operation must be kept clean and free of blood and saliva while curettage is being done. Surgical pack is applied directly after operation, and left for about two weeks. After removal of dressing, gentle toothbrushing and interdental stimulation are instituted; occlusion must be corrected; adequate diet should be prescribed. Patient must be made to realize importance of his coöperation; he should return for examination and prophylaxis at least twice a year; incipient lesions, when found, must be treated at once.

—*M.B.*

651—Kirkland, O.: **Gingivectomy vs. conservative treatment of periodontoclasia.** *N. Y. J. Dent.* **12**:235. June, 1942.

The method of treatment of periodontoclasia must be simplified. There are two favored methods of procedure in periodontia: conservative subgingival curettage, and gingivectomy. Each is valuable to the periodontist, and both of them must be used according to indications; a correct diagnosis will help determine the choice of technic. If only the early phases of developing periodontal disease are present, the conservative technic should be followed. However, where the lining of the gingival sulcus has been resorbed, and the underlying tissues have been involved, with evidence of pocket formation, gum resection should be the method of choice. Dr. Kirkland is an advocate of gingivectomy, for the following reasons: field of operation is opened to view; it is painless because done under anesthesia; post-operative dressing prevents post-operative pain; it is quicker; and it is possible to treat the entire mouth in much less time. The author has not found that resection leaves the gums and teeth unsightly, or the teeth unusually sensitive.

—*M.B.*

652—Marin, J. V.: **Treatment of mercurial and bismuth stomatitis by ascorbic acid.** *Revista Medica de Rosario.* Nov., 1941. Abstr. in *J. A. M. A.* **118** (14):1260. April 4, 1942.

Marin observed mercurial and bismuth stomatitis among syphilitic patients. Absence of ascorbic acid from their blood and urine suggested the advisability of administering the acid. His experience with ascorbic acid therapy in 10 cases of syphilis suggests that the acid has a detoxicating effect on the mercurial salts probably because of its reducing action. Ascorbic acid cures mercurial and bismuth stomatitis. It permits continuation of serial mercury and bismuth therapy for patients who do not tolerate compounds of these metals. Injection of large doses of ascorbic acid produces rapid, optimal results; its oral administration is not effective.

—*Copy*

653—Martin, H. and C. E. Koop.: **Precancerous mouth lesions of avitaminosis B: Their etiology, response to therapy and relationship to intraoral cancer.** *Am. J. Surg.* Aug., 1942. Abstr. *J.A.M.A.* **120**(8):647. Oct. 24, 1942.

Martin and Koop demonstrate from an analysis of the diets of 100 patients with precancerous stomatitis, 100 with oral cancer, and 100 normal controls, that degenerative and precancerous changes in the oral mucous membranes are among the important symptoms of deficiency disease, and also that avitaminosis B is the greatest single cause of these precancerous lesions. The material was drawn from the Head and Neck Clinic at Memorial Hospital, where about 400 new cases of mouth and pharyngeal cancer are seen annually and from

which at present about 1,500 active cases of oral cancer are being followed. In most cases of intraoral cancer there are in addition to the primary lesions definite degenerative (precancerous) changes in the oral mucous membranes which antedate the malignant growth. These degenerative and precancerous changes are due to some mild chronic irritation. It is probable that the most responsible irritant is the stomatitis of avitaminosis B, although several concomitant factors may be operative. At least three apparently unrelated types of clinical observations support the theoretical role of the B complex in the etiology and symptomatology of mouth cancer; the vitamin deficiency natures of (1) cancer cachexia, (2) radiation sickness, and (3) precancerous stomatitis of obscure origin. Their analysis of the dietary histories of 300 subjects led the authors to begin treatment with the routine administration of vitamin B, usually in the form of brewer's yeast, to all patients under treatment for intraoral cancer. The resultant beneficial effects were so gratifying that, although no methods for absolute statistical proof are yet available, they nevertheless concluded empirically that the abnormal changes in the oral mucosa resulting from avitaminosis B are undoubtedly more prevalent and of more importance in the etiology of mouth cancer than any other single form of chronic irritation and possibly of greater significance than the sum total of all other etiologic factors. The abnormal changes of inadequate intake of the vitamin B complex vary widely, but generally the evidence is plain for at least a tentative diagnosis of avitaminosis B, when an inflammatory lesion of the oral mucosa is associated with one or more of the following symptoms: malnutrition, mental depression, nervousness, insomnia, constipation, dermatosis, and onychodystrophy. At the Memorial hospital an investigation is in progress as to whether the incidence of an associated stomatitis (indicative of a B deficiency) is not more frequent in persons with esophageal, gastric, and rectal cancer than in those not so afflicted.

—Copy

654—Merritt, A. H.: **Surgery's place in the treatment of periodontoclasia.** *J. A. D. A.* **29**:771-773. May, 1942.

Subgingival curettage has two disadvantages: it is difficult to do because the field is unseen, and, unless reattachment occurs, it leaves the pocket with the possibility of reinfection. Surgery eliminates these two disadvantages. It has its legitimate place in periodontia, but it must not be abused.

There are three types of surgical procedures: flap operation, modified flap operation, and gum resection. The latter is the most radical, but also the most effective. It has the disadvantage of exposing root surfaces and therefore should be limited to posterior teeth. After healing, sensitive necks may be treated with silver nitrate, or formaldehyde in anteriors. Unless there has been extensive bone loss, little disfigurement follows resection. By application of surgery in periodontia, teeth that would otherwise have to be extracted can, in many cases, be restored to health. Every periodontist should be familiar with surgical procedures and competent to employ them when indicated.

—M.B.

655—Query: **Bleeding from mucous membranes caused by heparin.** *J. A. M. A.* **118**(17):1526. April 25, 1942.

Have cases been reported in which administration of heparin has caused bleeding from mucous membranes of gums and bowels? Answer: Reaction to heparin varies greatly in different patients, bleeding being more likely to occur if patient has a damaged liver, jaundice or hemorrhagic tendency because of avitaminosis. The drug should be administered with great caution and only with exact indications for its use.

—Celia Rich

656—Query: **Dental extraction and embolism.** *J. A. M. A.* **120**(7):578. October 17, 1942.

Is there any data to substantiate the claim that fatal embolism might follow tooth extraction? Answer: Fatal septicemia or pyemia has been caused by minute bacteria-carrying emboli resulting from tooth extraction. There have been a few reports recently of positive blood cultures following extraction of teeth with deep "pyorrheal pockets"; but there are no recorded instances of massive embolism of the lungs following extraction.

—Celia Rich

657—Query: **Lichen planus of the mouth.** *J. A. M. A.* **118**(10):855. Mar. 7, 1942.

Is there any cure for lichen planus of the mouth; what is the treatment? Answer: The treatment is essentially the same as for

these lesions elsewhere. Mental and physical rest are essential. Fowler's solution and other arsenicals and mercurials, and bismuth intramuscularly are indicated, but patient must be kept under observation for evidences of stomatitis or other untoward symptoms. If sensitive subjective symptoms develop, bland mouth washes are advisable, and careful attention to oral hygiene. High potency B complex capsules are also of value, and Roentgen rays in fractional doses, in trained hands, may be helpful in resistant cases.

—*Celia Rich*

658—Query: **Periadenitis mucosa necrotica recurrens.** *J. A. M. A.* **119**(11):918. July 11, 1942.

Query concerns case of woman of 43 with recurrent and rapidly receding pimples which rupture, exude a thick stringy substance, then disappear entirely. This has happened at frequent intervals. She had been treated successfully a year previously for lichen planus, with typical oral lesions, with injections of bismuth subsalicylate. All laboratory data normal. Answer: Small painless nodules on buccal mucosa with exudate like above suggests diagnosis of periadenitis mucosa necrotica recurrens, a condition whose course is chronic and usually resistant to ordinary treatment. Drugs such as phenolphthalin should be ruled out, also any possibly irritating tooth paste or wash. Oatmeal has been known to cause it, but as a rule it is seen in patients with nervous instability, endocrine imbalance or a generally low constitutional tone. Complete physical examination is advised and specific therapy applied for anemia or other conditions found. Soothing washes, and local applications of tincture of kino 5cc and tincture of myrrh 10cc painted on each night, may help.

—*Celia Rich*

659—Raybin, Murray: **Autoprophylaxis as a preventive for the recurrence of periodontoclasia.** *D. Outlook.* **29**(7). July, 1942.

A method of expanding periodontal pockets with base plate gutta-percha is described, its object being to make the root surface visible for the dentist and cleanable for the patient.

Home care of the teeth without the use of a toothbrush is advised. Substitutes for the toothbrush recommended are (1) a cotton holding instrument, one end of which is used to clean the tongue, (2) a porte polisher carrying soft wood point.

Interproximal cleaning and stimulation are stressed.

The daily cleaning and massage are augmented by a *weekly* "autoprophylaxis" when all of the teeth are thoroughly "porte-polished" with flour of silex before any calculus can become hardened. A disclosing solution is used by the patient to check the effectiveness of his efforts.

The advantages claimed for the "autoprophylactic method" are, that it is more sanitary, that it does not injure the hard or soft tissues, and that it is more thorough and efficient.

—*G.R.S.*

660—Rosebury, T.: **Is Vincent's infection a communicable disease?** *J. A. D. A.* **29**:823-833. May, 1942.

A very thorough review and evaluation of the knowledge to date on the contagiousness of Vincent's infection. It is contended that it has not been demonstrated that Vincent's infection is a communicable disease. Evidence of man-to-man transmission is entirely circumstantial, and can all be interpreted under the hypothesis that Vincent's infection depends for its development on predisposing conditions such as dietary deficiency. Current knowledge of the etiology and pathogenesis of this disease supports this hypothesis. It is nevertheless clear that infection plays an important part in the disease. The facts also fail to demonstrate the alternative, that Vincent's infection is not communicable. Since the disease has been prevalent among soldiers, it is important that the title question be answered in order to justify isolation (or failure to isolate) and other sanitary precautions in handling outbreaks. A plan for an experiment to elicit the needed information is therefore suggested.

—*M.B.*

661—Saghirian, L. M.: **Stomatological aspects of electrosurgical methods.** *D. Items Int.* **64**:112-121. Feb., 1942. *Also* March, 1942, pp. 206-211.

Electrosurgery may be divided into: 1. Fulguration and desiccation, 2. Coagulation, 3. Acusection (cutting). This last, electrosection, lends itself admirably to requirements of oral surgery. It is quick and efficient, post-operative pain is minimized,

bleeding controlled, and healing accelerated. Electrosurgery can be used in oral surgery for: removal of growths and biopsy specimens, correction of low attachments and flabby alveolar ridges, resection of pericoronal flaps, and exposure of unerupted teeth. The use of electrosurgery in periodontia is comparatively new; its purpose is to extirpate soft tissue side of pockets, and to produce interproximal sluice-ways and deflecting contours. The author's technic for periodontal electrosection is described. The electrosurgical apparatus is discussed, with differences in wave form. A fast cutting and low coagulating current is desirable in periodontal surgery. In the final analysis, the technic of the operator is of paramount importance.

Successful management of an electrosurgical case depends to a great extent on ability of the operator, and mastery of the instrument; but of equal importance is the stomatological study and clinical case management as a whole. Examination must include complete clinical oral, roentgenographic, stomatological, and general physical examination; various factors to be looked for in each are discussed. Immediately after this, steps are taken for localization and reduction of acute symptoms by prescribing a soothing antiseptic mouthwash, and establishing oral hygiene. Electrosurgery is contemplated when the diagnosis is completed and a clean field of operation is established. In periodontal surgery, it is advisable to confine treatment to no more than six teeth at a time. All essentials of good surgical technic must be carried out. Postoperative care is extremely important, and should include sedatives, mouthwash, and check-up visits. The various methods and agents for this are discussed. Zinc chloride 8%, or copper sulphate-glycerin packs are used to control granulation tissues. Restorations and corrections of existing abnormal conditions must supplement surgical treatment. Photographs illustrate the technic of electrosurgery and cases treated.

—*M.B.*

662—Schwartzman, J. and Grossman, L.: **Vincent's ulceromembranous stomatitis.** *Dentistry.* **2**:314-316. Jan., 1942.

This article represents a study of 9,706 children admitted to Metropolitan Hospital within a certain period; of these, 33 cases of Vincent's stomatitis were found, an incidence of 0.34%. Various methods of treatment were used; and all received vitamin C (150-600 mg.) daily, except those receiving nicotinic acid. Stained smears from 75 children with normal mouths, and 25 newborns, were negative for Vincent's organisms. A study was made to determine the transmissibility of the disease. Direct transmission from positive cases to normal cases failed; traumatization of the mucosa of the recipient before inoculation failed to produce the disease.

According to this study, additional factors besides the presence of the organisms and trauma are necessary for the production of this disease. Seven cases that received nicotinic acid, with no local therapy, showed a decreased average time for cure, showing nicotinic acid to be of considerable, if not specific, value in these cases. The authors conclude that this stomatitis was primarily due to a deficiency of nicotinic acid; and secondarily, to an infectious element which increased in inverse ratio to the concentration of nicotinic acid in the tissues.

—*M.B.*

663—Smith, W. J.: **Three types of Vincent's infection and their treatment.** *Brit. D. J.* **72**:140-141. Mar. 16, 1942.

The first type is the early mild stage with no systemic symptoms; gums not swollen; ulcers confined to buccal surfaces of interdental papillae. Treatment is local only: 25% chromic acid used in conjunction with hydrogen peroxide. Repeat for 2-3 days; may alternate with gentian violet.

Second type is characterized by extreme redness and vascularity of gingivae and mucosa; hypertrophy of gingivae; continuous ulceration around teeth; may have white patches on buccal mucosa and tongue. Nicotinic acid is very successful in these cases: 50 mg. five times per day. Improvement in 24 hours.

In third type, patient complains of pain on eating; teeth found to be normal; ulcers on buccal surface of interdental papillae. If this condition is left untreated, patient soon shows systemic toxic symptoms. But treatment is intravenous neoarsphenamine: use 0.3 gm. dose, and give 50 gm. glucose in 100 cc. water, orally, before injection; may repeat in one week, but not more than two doses. Local treatment as in first type.

Careful scaling necessary for all types;

therapy must not end until gingivae are in perfect health.

—*M.B.*

664—Sorrin, Sidney: **Acrylic splints for loose teeth.** *Dentistry.* June, 1942. Condensed from *N. Y. Univ. Periodont. Bul.*, Feb., 1942.

The temporary splinting of loose teeth is sometimes desirable until such time as they are able to carry their normal functional load. Thread, wire, and cast or wrought metal are the materials most commonly used for temporary splinting. The technique of using these materials is described and the disadvantages of each noted.

The acrylic splint is reinforced by wire and its use is confined to small segments. Advantages are: "(1) complete immobilization of teeth; (2) smoothness; (3) its slight flexibility and festooning holds the teeth securely without adjustments; (4) it is unaffected by saliva; (5) it is not unsightly; (6) it is not displaced by the toothbrush; (7) it is inexpensive."

The method of construction is given in detail.

—*G.R.S.*

665—Swendiman, G. A.: **Maintenance of interproximal contact in periodontoclasia.** *D. Digest.* **48**:18-19. Jan., 1942.

Packing of food between teeth with loose or open contacts is injurious, causing destruction and inflammation of soft tissues, and formation of pockets. The use of toothpicks, or snapping of ligatures upon the gingivae, should be avoided and discouraged. It is assumed that the patient will practice oral hygiene by proper toothbrushing.

The gum tissue between the teeth must be protected by tight contacts; and since tight contacts eventually become loose or open from tooth movement, measures must be taken to prevent such separation. The author's method—after periodontal tissues are restored to health—is to use three-quarter inlays on anterior teeth, with soldered contacts. In posteriors, he uses broken stress inlays, with a dovetail rest lug on one inlay, and a lug seat in the adjacent inlay. This technic is outlined.

—*M.B.*

666—Thoma, K. H.: **Adenocarcinoma of maxilla.** *Am. J. Orthodont. and Oral Surg.*, Feb., 1942. Abstr. *J. A. M. A.* **119**(3):291. May 16, 1942.

Thoma reports 5 cases of adenocarcinoma of the maxilla and discusses the invasive character of the tumor and its tendency to recur after operation and to extend into the paranasal sinuses. Osseous and visceral metastasis may occur. Therefore, adenocarcinoma should receive prompt and radical treatment by a wide excision including the adjacent bone and followed by irradiation. Local recurrence is common and should be dealt with immediately, or the prognosis will be poor.

—*Copy*

667—Thomas, B. O. A.: **Effective interdental stimulation.** *J. A. D. A.* **29**:741-743. May, 1942.

Simpler methods of gingival massage are necessary to obtain better patient coöperation. The problem in periodontal disease is to restore gingival tissues as nearly to original condition as possible, and to prevent formation, or deepening, of pockets. Treatment can be divided into three parts: removal of irritating agent; eradication of infection and inflammation; stimulation of epithelium to hornification. The first of these is curettage which may also attain the second result, but drugs may have to be used. The third is achieved by massage; for this, various instruments may be used: fingers, toothbrush, rubber point, rubber brush, dental floss, or wood stimulator. The author describes a simple technic of massage, using a round, polished wood toothpick, inserting the end into interdental space and pressing apically, with constant pressure for a few seconds, and repeating four to five times in each interdental space. This does not replace the toothbrush, but is merely an adjunct to brushing.

—*M.B.*

668—Vincent's Infection: "Trench Mouth." *D. Record.* **62**:22. Jan. 1942.

Girls in clothing factories are forming a high proportion of victims of wartime increase in "trench mouth." This increase recalls a similar increase in the last war. A demonstrator in *Clinical Dental Surgery* at Leeds Dental Hospital writes that the civilian population is showing a great increase in susceptibility to the disease. He says a surprising percentage of cases display, if not an actual dislike, at least a disinclination to eat fresh fruit and vegetables.

—*M.B.*

The army and Vincent's ulceration. *Brit. D. J.* **72**:1-5. Jan. 1, 1942.

This article presents excerpts from various official communications and publications of

the Army Dental Corps of the British Army, on the subject of Vincent's infection—description of the disease, treatment, and especially the precautions to be taken—in an attempt to control outbreaks of this condition. Description of the disease and its treatment coincide with the ideas prevalent in this country, but in referring to etiology, they state that the Vincent's organisms have not the close etiologic relationship with the disease that was formerly believed they had.

—*M.B.*

669—Waddill, L.: **Successful treatment of periodontoclasia.** *D. Survey.* **18**:171-175. Feb., 1942.

The chief factors making for success in treatment of periodontoclasia are proper selection and use of scaling instruments, and coöperation of the patient in systematic home care of the mouth. Instruments should be light, small, and easily inserted beneath the gum margins. The instruments most commonly used in periodontia are discussed. The bulk of the deposits in interproximal spaces can be removed with a spoon excavator with a blade not more than 1 mm. wide and ¼ mm. thick, sharpened as a chisel at an angle of 45 degrees; it should be used with a planing motion. All instruments should be so placed in relation to the teeth that the deposits can be removed with strokes parallel to their long axes. In all cases, use a porte polisher on all tooth surfaces after removing calculus. Always examine the patient at a subsequent visit for any calculus that may have been missed.

—*M.B.*

670—Ziskin, D. E., L. R. Stowe, E. V. Zegarelli: **Dilantin hyperplastic gingivitis: its treatment and prevention.** *Archives of Neurology and Psychiatry.* Nov., 1941. Abstr. *J. A. M. A.* **118**(1):81. Jan. 3, 1942.

Ziskin and his associates studied the gums of 14 epileptic patients, aged from 9 to 44, taking phenytoin sodium daily. Three boys aged 8, 13, and 17, respectively, whose seizures were controlled with phenobarbital, were included for comparison. The chief complaints of the patients receiving phenytoin sodium were bleeding from the gums, enlargement of the gums, and difficulty in mastication. Without therapy phenytoin gingivitis progresses steadily. As proliferation progresses, the teeth are moved out of their natural alignment, and the interseptal bone may be resorbed, producing looseness and sometimes loss of the teeth. If the hyperplastic tissue is extracted the appearance of the gums returns to normal for a time without further treatment. Vigorous massage of the interdental papillae or surgical intervention followed by massage was more successful. Gingival treatment should probably be begun when phenytoin therapy is started. Administration of the drug need not be discontinued because of the gingival hyperplasia. Other sedatives used in the control of epileptic seizures do not stimulate the gums to hyperplasia. The resemblance of the phenytoin gingival hyperplasia to the hypertrophy seen in scurvy is superficial; the hypertrophy in scurvy is caused by swelling and not by hyperplasia as it is in phenytoin gingivitis. Pain, marginal necrosis of the gums, and occasional petechial hemorrhage are absent in phenytoin hyperplasia, as are constitutional purpura and soreness of the joints.

—*Copy*

NOTHING NEW UNDER THE SUN

"Carrets are good to be eaten with salt fish. Therefore sowe Carrets in your Gardens, and humbly praise God for them, as for a singular and great blessing; so thus much for the use and benefit had in the commonwealth by Carrets. Admit if it should please God that any City or towne should be beseiged with the Enemy, what better provision for the greatest number of people can bee, then every garden to be sufficiently planted with Carrets."

RICHARD GARDINER (1597)

Quoted by *The Home Garden*

EXTRACTS* FROM THE SECRETARY'S LETTER, DECEMBER, 1942, TO THE MEMBERS OF THE AMERICAN ACADEMY OF PERIODONTOLOGY

The Council of the American Academy of Periodontology held a business meeting in the Hotel Statler, St. Louis, Missouri, on Thursday, August 27th, 1942. The meeting was called to order at 9:30 A. M., by Pres. Robert L. Dement. The following members of the Council were present:

Robert L. Dement	Edgar D. Coolidge
James A. Sinclair	Hunter S. Allen
Samuel R. Parks	Russell A. Sand

Raymond E. Johnson

Other members of the Academy were present as follows:

A. W. Bryan	T. E. Braly
Virgil Loeb	C. E. Chamberlain
Rowe Smith	W. O. Talbot
Edward L. Ball	Leo. F. Marré
J. A. Jacobsmeyer	Gerald A. Mitchell
Justin D. Towner	Malvern D. Huff
Arthur H. Merritt	Grace R. Spalding
Olin Kirkland	Walter H. Scherer
Carlos H. Schott	

The Secretary's report was read and accepted.

The Treasurer's report, (C. Wesley Marriott, Treasurer), was read by the Secretary and accepted.

It was voted that the dues of members in service be suspended for the duration of the war.

Reports of the following committees were presented formally and accepted.

Program—Walter H. Scherer, Chairman.

Clinic—Edgar D. Coolidge, Chairman.

Scientific Investigation—J. A. Sinclair, Chairman.

Academy Round Table — Rowe Smith, Chairman.

President Dement expressed his thanks to the different Chairmen and personnel of Committees for their untiring efforts in preparing such an excellent program. It was indeed a great disappointment to have to cancel the Boston Meeting as the program was completely set up for the printers.†

The report of the General Arrangements Committee, C. B. Vaughan, Chairman, was read by the Secretary and accepted.

President Dement expressed his thanks to Dr. Vaughan, who had worked so faithfully in making arrangements for this meeting. It was moved that a vote of thanks be extended to him for his untiring efforts.

The report of the Nomenclature Committee, Harry Lyons, Chairman, was read by the Secretary and accepted.

The report of the Sub-Committee on Scientific Investigation, Dickson G. Bell, Chairman, was presented formally by the Secretary.

It was not possible for this committee to present any evaluation of interesting periodontal data until additional case history reports are received. Chairman Bell submitted three completed reports to the Council for examination. The information which may be obtained from such case reports should be very valuable. It was the hope of the Council that the members who have expressed their willingness to participate in this clinical project send their reports to Chairman Bell as soon as possible.

The report of the Personal Relations Committee, Konrad Lux, Chairman, was presented by the Secretary formally.

The report of the Publications Committee, Harold J. Leonard, Chairman, was presented by Arthur H. Merritt. It was voted that this report be laid on the table.

The report of the Educational Planning Committee, Willa Yeretsky, Chairman, was presented formally by the Secretary.

The report of the Constitutions and By-Laws Committee was presented formally by Chairman Grace Rogers Spalding. The changes, recommended by this committee were approved by the Council and will be voted upon at the next Annual Meeting of the Academy.

*Including only such items as will make a permanent record of the Council Meeting in St. Louis, Aug. 27, 1942.

†See J. Periodont. 13(2):99 and 118. July, 1942.

Grace Rogers Spalding, Editor of the Journal of Periodontology, submitted the question of Supplements to the Journal to be printed in April and October.

It was voted that the Editor be authorized to issue two Supplements of the Journal for the ensuing year 1943.

It was suggested by Arthur H. Merritt that a list of the men who have been certified by the American Board of Periodontology be published in the Journal of the American Academy of Periodontology and also in the Roster.

The report of the Journal Endowment Committee was presented formally by Arthur H. Merritt, Chairman, and accepted. This Committee makes the following recommendations:

First, that a letter be sent to the members with the annual bill for dues, calling attention to the Fund and soliciting contributions to it.

Second, that such a letter be drafted by the Committee and sent out bearing their names.

Third, that the present practice of attaching a subscription blank to the bill for dues be continued.

Fourth, that instead of sending flowers at the death of a friend or colleague, where there may be an embarrassment, members be requested to make a contribution to the Journal Endowment Fund, following which the secretary will write to the family of the deceased, informing them that Dr. Blank has made a contribution to the Endowment Fund of the American Academy of Periodontology (without mentioning the amount) in memory of the deceased.

Fifth, that members receiving honorariums for lectures, be urged to donate them to the Endowment Fund.

Sixth, suggest to the members that they consider making bequests to the Endowment Fund in their wills.

Seventh, with a view to keeping the Fund before the members, the Committee recommends that the names of all contributors be published each year in the Journal of Periodontology without stating the amounts contributed.

Respectfully submitted,
Isador Hirschfeld,
Haidee Weeks,
Arthur H. Merritt, Chairman.

It was moved and carried that the report of the Journal Endowment Committee be published in the Journal of Periodontology, and also that the Treasurer include a letter framed and signed by this Committee to be included with each statement.

It was moved and carried that the expenses concurred by Committee Chairmen in arranging the program be presented to the Journal Endowment Fund as a gift.

Memorial tributes were read for the following deceased members: Andrew J. McDonagh, William Y. Hayden, Clyde C. Sherwood, L. A. Neil, and John H. MacKay.

It was moved and carried that these memorials be included in the minutes and copies sent to their wives.

Applicants for membership were approved by the Council and will be submitted to the membership for consideration before their election at the Annual Meeting.

The report of the Post-Graduate Study Group Committee, Grace Rogers Spalding, Chairman, was discussed.*

A motion was passed by the Post-Graduate Study Group, May 20, 1942, at Ann Arbor, Michigan, that the Council of the American Academy of Periodontology be requested to arrange a three-day Study Course for the last Monday, Tuesday, and Wednesday in April, 1943, at the W. K. Kellogg Institute in Ann Arbor; the Course to be planned and arranged for by a Committee from the Academy in coöperation with the Director of the Kellogg Institute, Dr. Paul H. Jeserich.

It was moved and carried that a special committee be appointed by the President to arrange a Course to be given at the Kellogg Foundation in April, 1943.

The following Committee was appointed: Grace Rogers Spalding, Chairman, Willa Yeretsky, and Balint Orban. The program will be announced at an early date.†

The following members of the Academy are on active duty with the armed forces of the United States:

Lt. Col. Russell A. Sand, Surgeon Gen'l's Office, Washington, D. C.

Capt. H. G. Worman, 0217560, 26th General Hospital, A.P.O. 3309, c/o Postmaster, New York City, N. Y.

**See* p. 44 for Program of Course given in May, 1942.

†The program will be published in the April Supplement of the Journal of Periodontology.

First Lt. Saul Schluger, Station Hospital, Camp Chaffee, Fort Smith, Ark.
Major Jacoby T. Rothner, D.C. Station Hospital, Camp Edwards, Mass.
First Lt. Jack S. Rounds, D.C. Camp Callan, San Diego, Calif.
Capt. Leo F. Marré, D.C. c/o Bushnell Gen'l Hospital, Brigham City, Utah.
Capt. Wm. Branstad, D. C. 0-273480 Dept. Dental Clinic No. 4 A.P.O. No. 25, c/o P.M., San Francisco, California.

Owing to the fact that the Annual Meeting had to be postponed, it was the expression of the Council that the American Academy of Periodontology hold an annual business meeting so that such matters as voting on the enclosed changes in the Constitution and By-Laws, new members, and other pertinent business may be acted upon at this time.

Dr. Edgar D. Coolidge has made arrangements for holding our meeting at the Medical Arts Building, 185 North Wabash, Top of the Town Restaurant, on Monday, February 22nd, at 9:00 A.M. In order to hold this meeting and vote on the necessary annual business of the Academy it will be necessary to have a quorum of twenty active members, representing not less than five states or provinces and a majority of the membership of the Council.

Respectfully submitted,
Raymond E. Johnson,
Secretary.

The Journal of Oral Surgery

For some months we have been hearing about the prospect of an addition to our current dental literature in the form of a journal devoted to oral surgery. It has been our hope that nothing would interfere with the development of this prospect into a reality. The first issue will appear this month and we wish to congratulate those who are responsible for the culmination of many efforts directed toward this end.

With the support of the American Dental Association and guided by such capable men as are listed as editors and members of the editorial board* the Journal of Oral Surgery is certain to be a real and much needed asset to our current literature.

The Journal of Periodontology wishes all success to this new publication and its editors.

**See J.A.D.A.* 30(1):126-28. Jan. 1943.

In Memoriam

JOHN H. McKAY, April 28, 1942

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